

**California High-Speed Rail Authority**



**RFP No.: HSR 13-57**

**Request for Proposal for Design-Build  
Services for Construction Package 2-3**

**Book IV, Part G.1 – Design Variance Report**



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- Coincident Start of Vertical Curve with the End of a Spiral
- Substandard Maintenance Clearance at Crossover Structures
- Viaduct Spans Greater Than 330 Feet at USACE Levee Crossings



# CALIFORNIA HIGH-SPEED RAIL PROGRAM DESIGN VARIANCE REQUEST



DVR NO: 0014 DVR TITLE: Coincident Start Vertical Curve with

Prepared by: Keith Seymour Firm: URS/HMM/Arup, a JV Company

## REVIEW

Supported by: Johnny Kuo Firm: PB

### PMT System-Level Review

Infrastructure	<input checked="" type="checkbox"/> Support DVR <input type="checkbox"/> Do Not Support	Railroad Systems	<input checked="" type="checkbox"/> Support DVR <input type="checkbox"/> Do Not Support
Operations & Maintenance	<input checked="" type="checkbox"/> Support DVR <input type="checkbox"/> Do Not Support	Rolling Stock	<input checked="" type="checkbox"/> Support DVR <input type="checkbox"/> Do Not Support
Systems Integration	<input checked="" type="checkbox"/> Support DVR <input type="checkbox"/> Do Not Support	Safety & Security	<input checked="" type="checkbox"/> Support DVR <input type="checkbox"/> Do Not Support
Engineering Manager	<input checked="" type="checkbox"/> Support DVR <input type="checkbox"/> Do Not Support	Criteria Classification:	

PMT Engineering Manager Recommendation: Recommend acceptance of this DVR based on the preliminary design. CP2-3 Addendum 5 revises the design criteria to reduce the speed of the turnouts connecting the platform track with the main track shall to permit an operating

PCM DB Oversight Manager Recommendation: N/A

CHSRA Engineering Mgr. Recommendation: Recommend Acceptance

DVR Committee Recommendation:

## APPROVAL

Authority action: ☒ Approve ☐ Reject

Name: Ofelia P. Alcantara Title: Director of Design & Construction

Signature: [Signature] Date: 9/30/14



## CHST DESIGN VARIANCE REQUEST FORM

### Part 1 – Design Variance Request Information

**Title/Subject:** Coincident Start of Vertical Curve with the End of a Spiral

**Number:** URS-INF-2-0014 **Revision:** 2

**Contract Name & Number (Final Design):** HSR 06-0003

**Region:** Fresno - Bakersfield

**Location:** Hanford (H Alignment)

**Regional Consultant's / Third Party Design Drawing Reference:** CB1824 TO CB1830

#### Date Submitted to RMT & PMT

PREPARED / SUBMITTED BY:

NAME: Keith Seymour

COMPANY: URS/HMM/Arup A Joint Venture Company

SIGNATURE:

DATE: 04/29/14



(Engineering Seal)

*\*Note design variance numbers will follow the same convention: "ABC" will abbreviate the name of the firm submitting the variance, "DEF" abbreviates the name of firm receiving the variance request, "X" is the revision number starting from 0, and the last four numbers count the number of total submittals starting from one.*

## Part 2 – Design Variance Request Information

<b>CHSTP DESIGN REQUIREMENT</b> Include reference to drawings, design criteria, technical memos, specifications	Technical Memo 2.1.2 Alignment Design Standards R0 (dated March 26, 2009)
<b>DESIGN CRITERIA REQUIRING A VARIANCE</b>	<p><b>Section 6.1.1</b>  <b>Minimum Lengths of Alignment Segments</b>  Attenuation time, based on the most conservative requirements, shall be:  For <math>V &lt; 300</math> km/h (186 mph):</p> <ul style="list-style-type: none"> <li>Desirable attenuation time: not less than 2.4 seconds.</li> <li>Minimum attenuation time: not less than 1.8 seconds.</li> <li>Exceptional attenuation time: not less than 1.5 seconds.</li> <li>Attenuation time on the diverging route in curves adjacent to or between turnouts: 1.0 seconds.</li> </ul> <p><b>Section 6.1.7</b>  <b>Vertical Curves in Spirals</b>  Due to potential maintenance difficulties, it is desirable to avoid use of vertical curves in spirals. The desirable distance between end of spiral and beginning of vertical curve or end of vertical curve and beginning of spiral is 160 feet, with a minimum limit of 100 feet (30 m). Overlap between vertical curves and spirals may be permitted as an Exceptional condition, but only where it can be shown that practical alternatives have been exhausted.</p>
<b>REASON FOR REQUESTING A VARIANCE</b>	The horizontal spiral in the return curve of the 110 mph turnout is coincident with the beginning of the vertical curve of the station tracks at all four quadrants. This does not provide the exceptional 1.5 seconds of attenuation time (242 feet) indicated in TM 2.1.2 Section 6.1.1 or the minimum 100 feet called for in TM 2.1.2 Section 6.1.7.
<b>JUSTIFICATION FOR VARIANCE</b>	<p>Kings/Tulare Regional Station is raised on a viaduct and requires vertical curves north and south of the station to lower the tracks back to grade. The vertical curves are on the mainline between the turnout for station tracks and the platforms. This allows for appropriate attenuation length on the mainline and a 0% grade throughout the station.</p> <p>The 15% Record Set design provides the standard 6,000-foot station tracks at 110 mph (from point of switch to point of switch). For this length the</p>

	<p>alignment is on a four-track viaduct, elevated over the Cross Valley Rail Road and State Route 198.</p> <p>The point of vertical intersection of the vertical curves on the station tracks matches the mainline points of vertical intersection to minimize the elevation difference between the tracks. The mainlines are designed to achieve a desirable length (1,137 feet) with a 0% grade through the station. The station track vertical curves are 400 feet long, which achieves the minimum segment length at 110 mph.</p>
<b>PROPOSED ALTERNATIVE DESIGN REQUIREMENT</b>	<p>Alternative vertical alignments to reduce or eliminate the design variance requests are described below.</p> <p><b><u>Option 1 – Provide 0 % Grade Station Tracks</u></b></p> <p>Providing a 0% grade throughout the platforms and four-track station approaches would eliminate the vertical curves and the design variance request. The platform elevation would be unchanged, but this would require lengthening the viaduct by approximately 2,950 feet and raising the four-track viaduct by up to 7 feet.</p> <p><b><u>Option 2 – Achieve Exceptional Attenuation Length</u></b></p> <p>Per TM 2.1.2 Section 6.1.7, a 160-foot desirable separation could be provided between the spiral and the vertical curve. However, this 160-foot separation would not meet the exceptional minimum requirements of Section 6.1.1. A separation of 242 feet could be provided to achieve the exceptional criteria of Section 6.1.1 while exceeding the 160-foot desirable separation in Section 6.1.7. This instance was discussed with the Engineering Management Team, and it was agreed that placing the start of the vertical curve coincident with the end of the spiral was preferable to achieving 160 or 242 feet of separation. Placing the two elements coincident allows the horizontal and vertical moves to occur simultaneously.</p> <p><b><u>Option 3 – Extend Station Tracks</u></b></p> <p>As shown in Appendix B, the station tracks could be extended to provide the minimum attenuation length between the spiral and the vertical curve. The station tracks and four-track viaduct length would increase by approximately 1,000 feet. Trains</p>

	<p>approaching the station would need to reduce speed earlier due to the turnout's location farther from the station. A design variance to Directive Drawing 2.1.3 – Interlock A would be required for the nonstandard position of the station turnouts.</p> <p><u>South of the Station</u> Desirable attenuation can be provided between the return curve spiral and the vertical curve of the station tracks south of the station by sliding the station track turnouts 610 feet south. The mainline vertical curve south of the turnouts would achieve the minimum length (1,200 feet), and the four-track viaduct would require lengthening by 610 feet. The shift south would also require relocating one system site and lengthening the access road. The distance between the station turnouts and station crossovers would decrease by 610 feet.</p> <p><u>North of the Station</u> Desirable attenuation can be provided between the return curve spiral and the vertical curve of the station tracks north of the station by sliding the station track turnouts 388 feet north. This would require lengthening the four-track viaduct by 388 feet. The shift north also requires relocation of a systems site and lengthening of the access road.</p>
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### Part 3 – Impact Analysis

<b>OPERATIONS</b>	None identified
<b>MAINTENANCE</b>	With the station track spiral coincident with the beginning of the vertical curve, maintenance requirements may be increased to preserve the geometry.
<b>INFRASTRUCTURE</b>	None identified
<b>RAILROAD SYSTEMS</b>	None identified
<b>RELIABILITY/FUNCTIONALITY</b>	None identified
<b>THIRD PARTY (Utility, Freight, Caltrans, RR, other)</b>	None identified
<b>SAFETY AND SECURITY</b>	None identified
<b>DIRECT COST</b>	None identified
<b>OTHER</b>	Ride quality may be reduced from not achieving minimum attenuation.

#### Part 4 – Mitigation Measures

<b>OPERATIONS</b>	None identified
<b>MAINTENANCE</b>	Slab track could be used to mitigate maintenance concerns of providing the station track spiral coincident with the beginning of the vertical curve.
<b>INFRASTRUCTURE</b>	None identified
<b>RAILROAD SYSTEMS</b>	None identified
<b>OTHER</b>	The vertical curve was located coincident with the station track spiral to avoid introducing a segment shorter than the length required to provide minimum attenuation. Ride quality may also be reduced; however, designing the two elements coincident allows the horizontal and vertical moves to occur simultaneously.

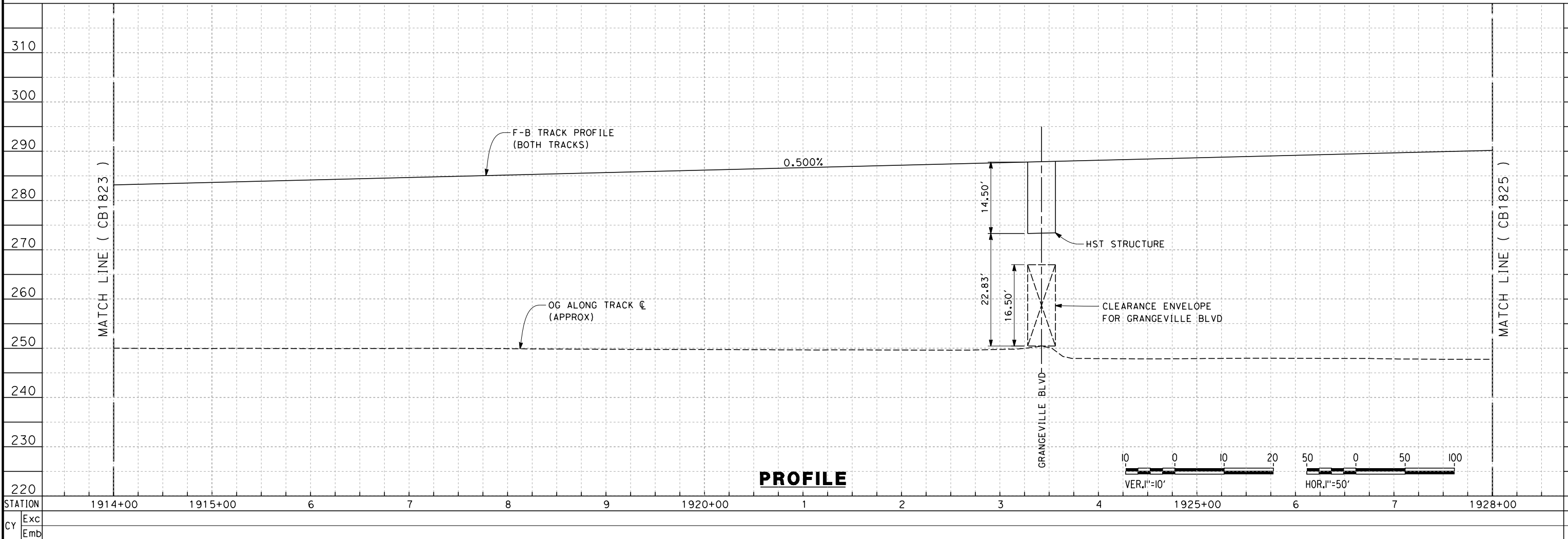
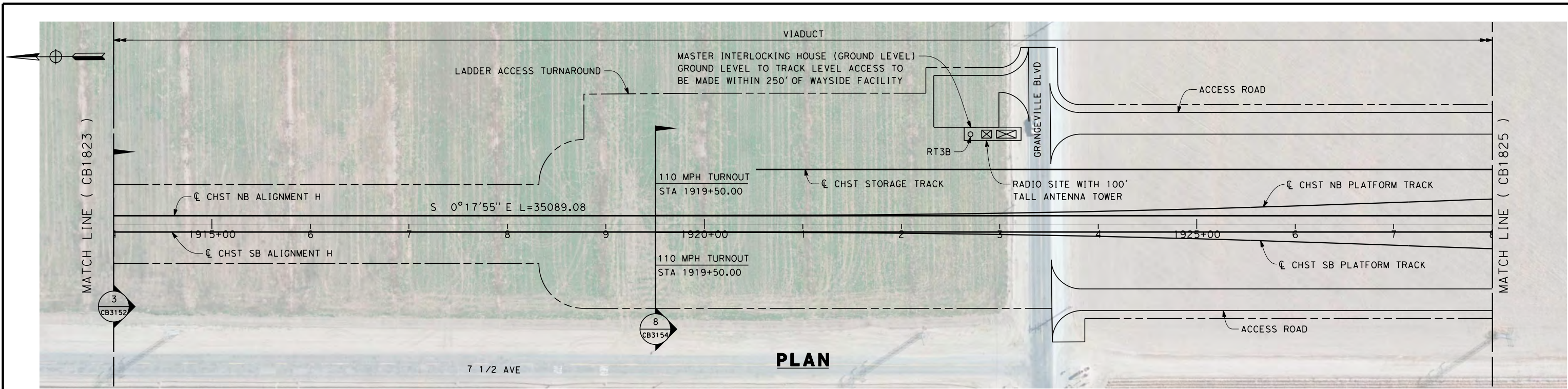
#### Part 5 – List of Supporting Documentation to Design Variance Request

<b>ANALYSIS</b>	N/A
<b>PUBLICATION/STANDARD EXTRACTS</b>	N/A
<b>RISK ASSESSMENT</b>	N/A
<b>DRAWINGS</b>	Record Set CB1824 through CB1830 Alternative Design Exhibits CB1824 through CB1830
<b>CALCULATIONS</b>	N/A
<b>EXPERT TESTIMONIALS</b>	N/A
<b>CORRESPONDENCE</b>	N/A
<b>OTHER</b>	N/A

Appendix A – Record Set CB1824 through CB1830



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DESIGNED BY  
A. POLING  
DRAWN BY  
J. BORGHESI  
CHECKED BY  
K. SEYMOUR  
IN CHARGE  
R. COFFIN  
DATE  
12/31/13

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**NOT FOR  
CONSTRUCTION**

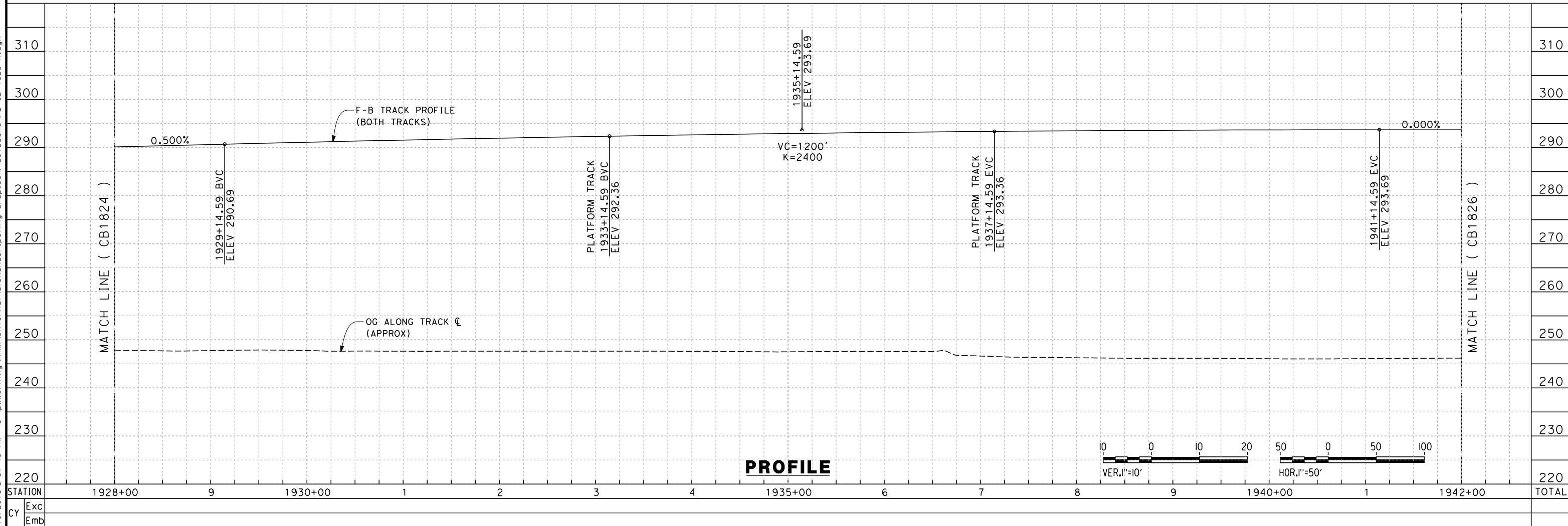
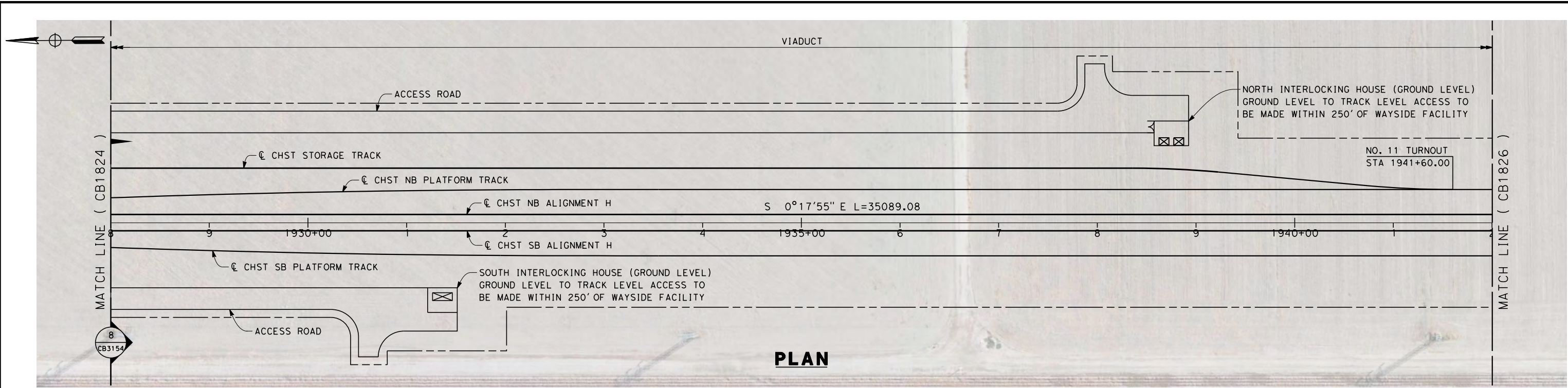


**CALIFORNIA HIGH-SPEED TRAIN PROJECT  
FRESNO TO BAKERSFIELD**  
HANFORD SUBSECTION  
ALIGNMENT H  
STA. 1914+00 TO 1928+00  
PLAN AND PROFILE

CONTRACT NO.  
HSR 06-0003  
DRAWING NO.  
CB1824  
SCALE  
AS SHOWN  
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18 OF 31



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A. POLING  
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J. BORGHESI  
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R. COFFIN  
DATE  
12/31/13

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CONSTRUCTION

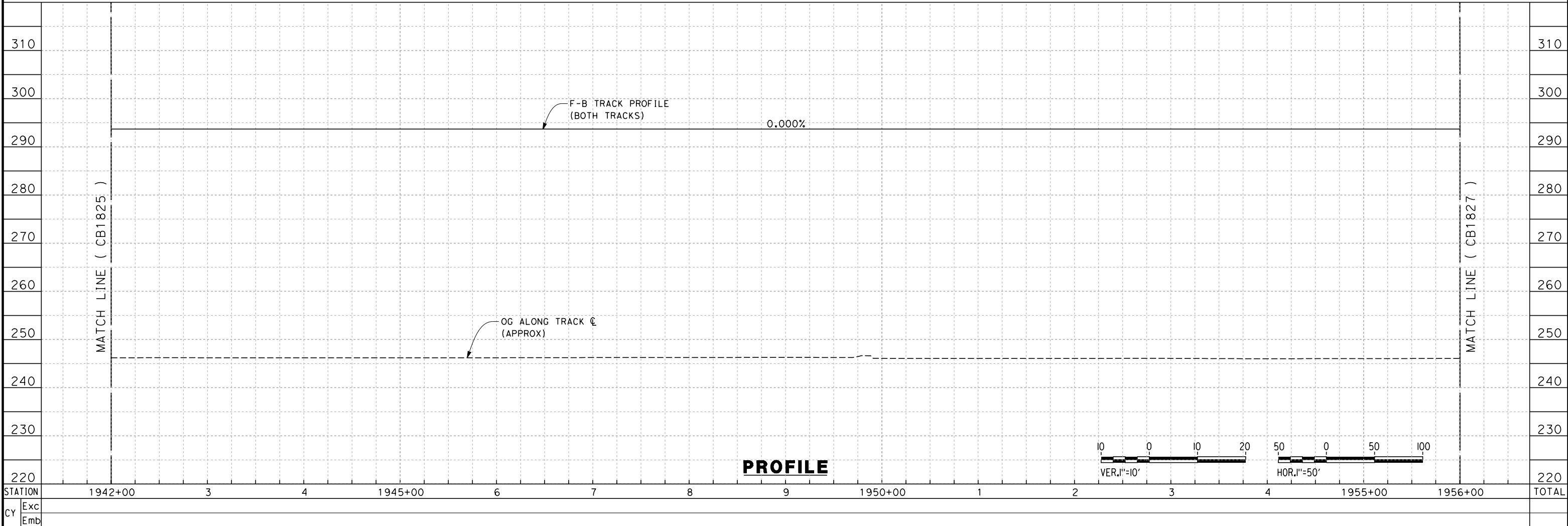
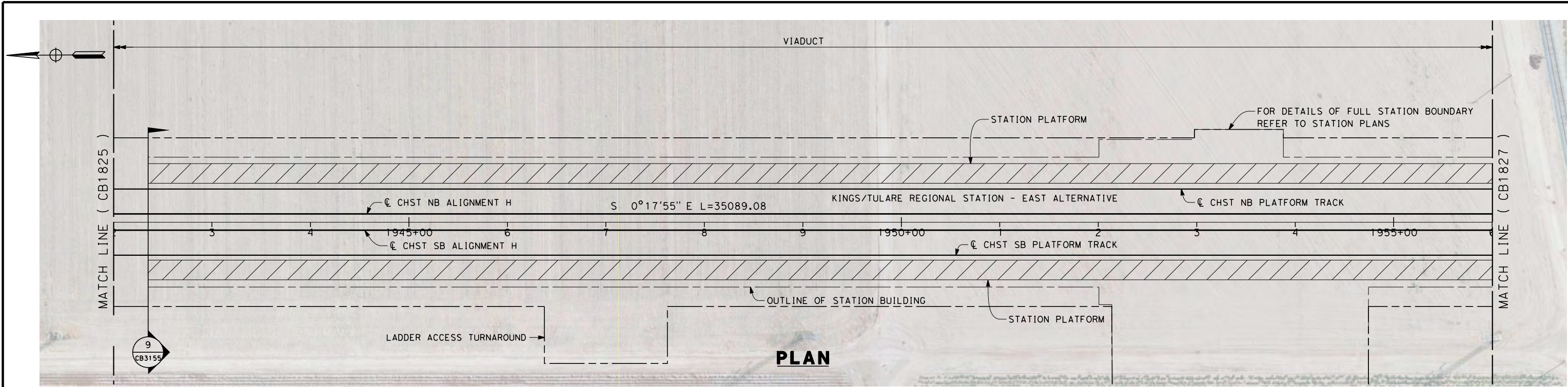




CALIFORNIA HIGH-SPEED TRAIN PROJECT  
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HANFORD SUBSECTION  
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STA. 1928+00 TO 1942+00  
PLAN AND PROFILE

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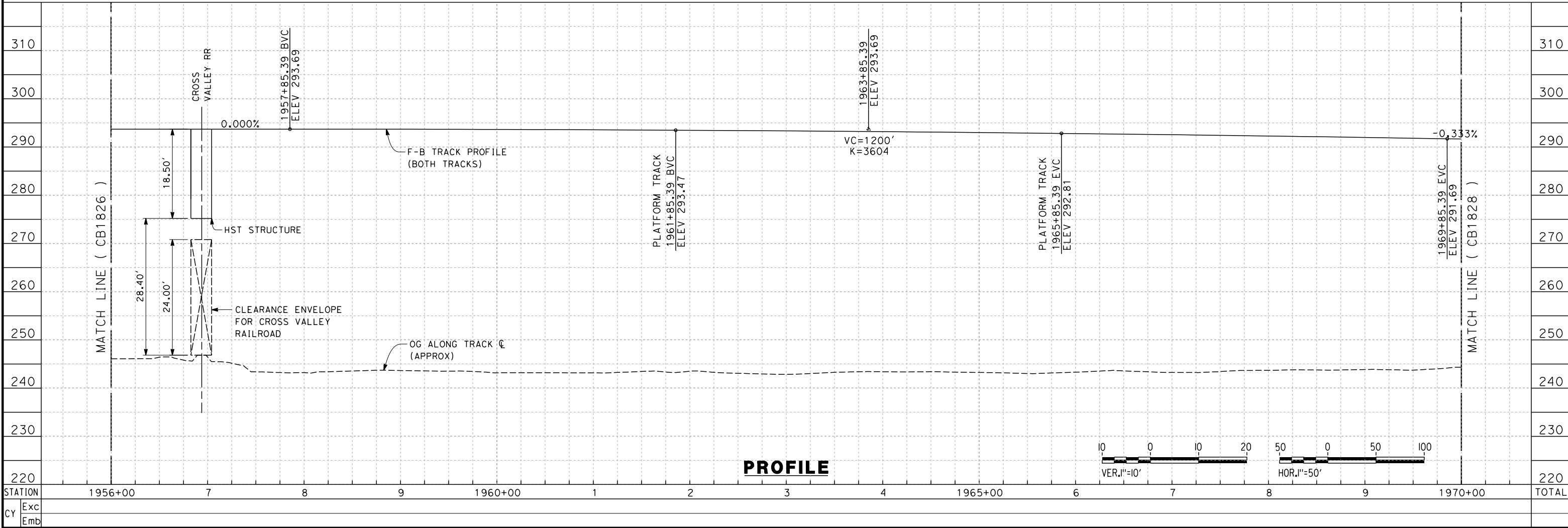
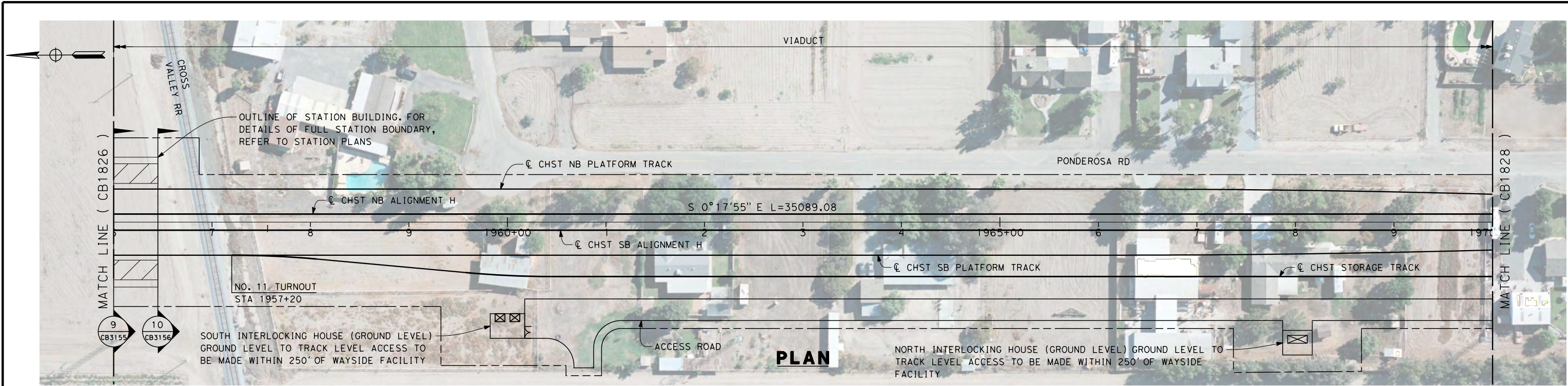
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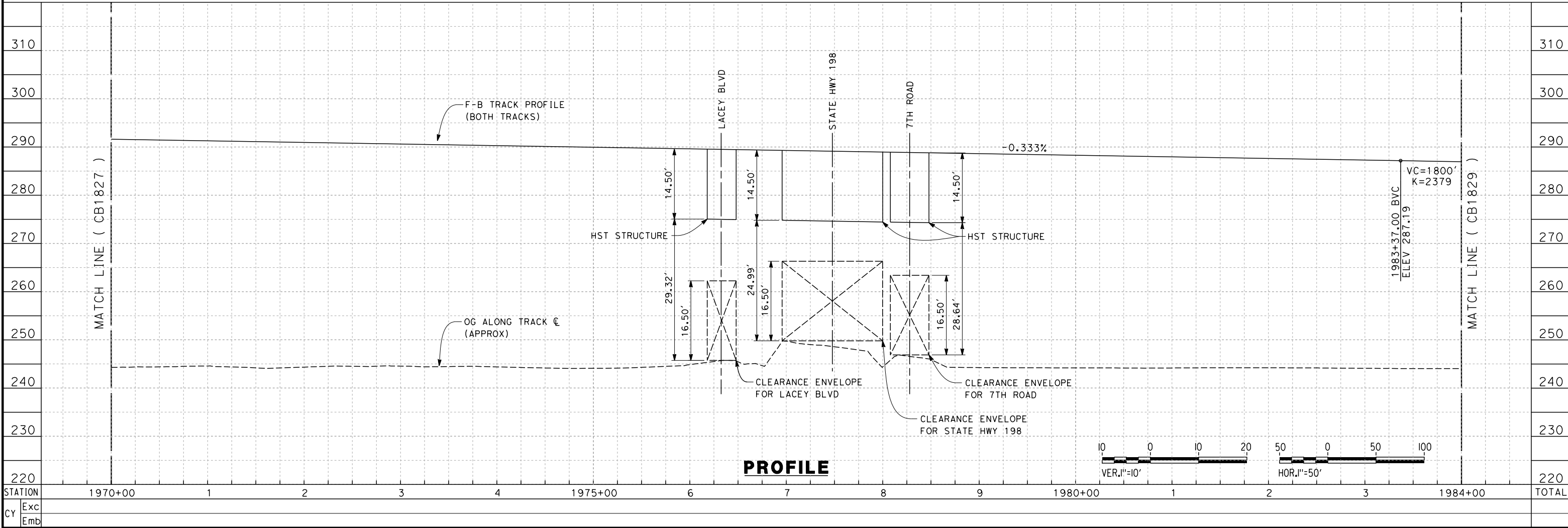
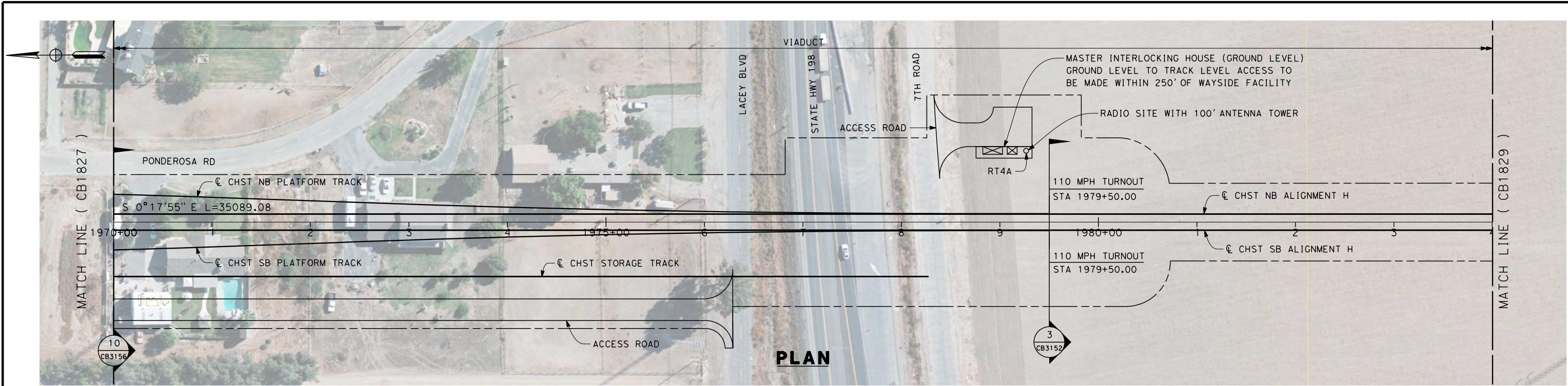


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PLAN AND PROFILE

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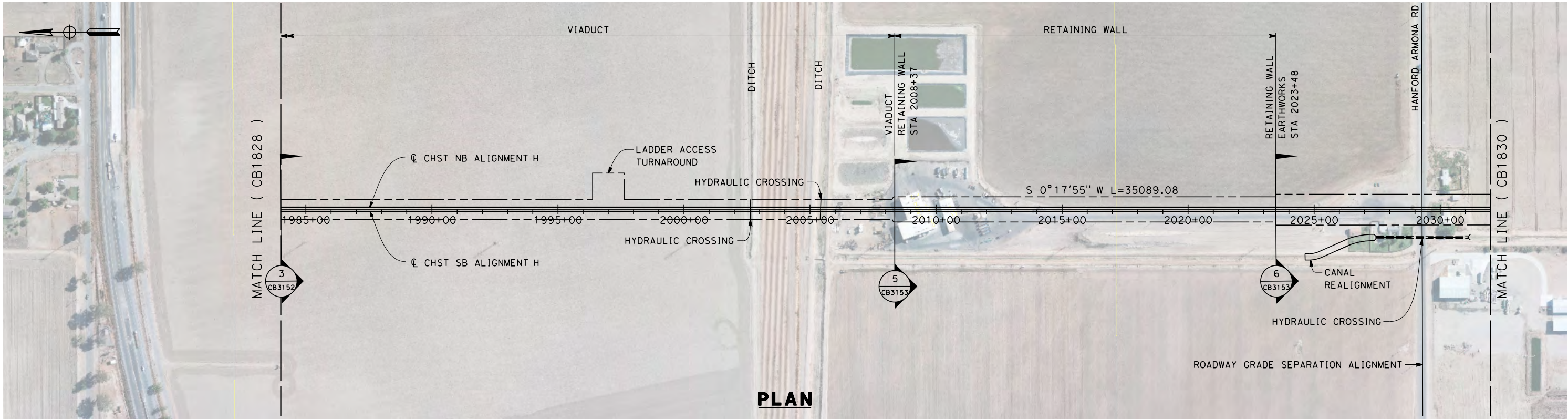


**CALIFORNIA HIGH-SPEED TRAIN PROJECT  
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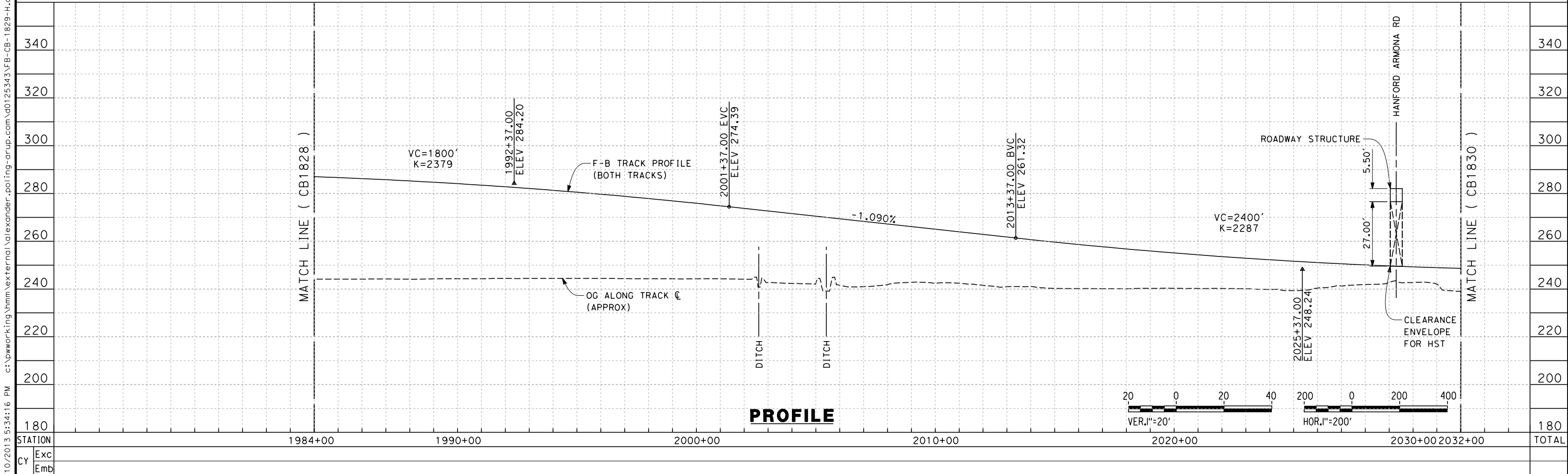
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22 OF 31



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PLAN



PROFILE

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IN CHARGE R. COFFIN
DATE 12/31/13

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CONSTRUCTION**



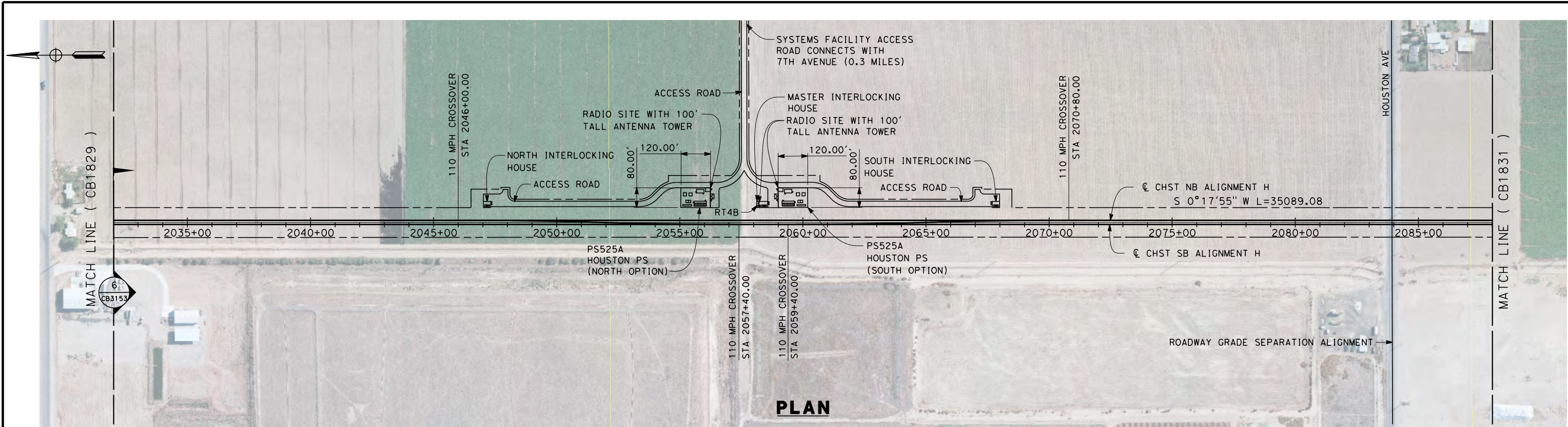
**CALIFORNIA HIGH-SPEED TRAIN PROJECT  
FRESNO TO BAKERSFIELD**

HANFORD SUBSECTION  
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STA. 1984+00 TO 2032+00  
PLAN AND PROFILE

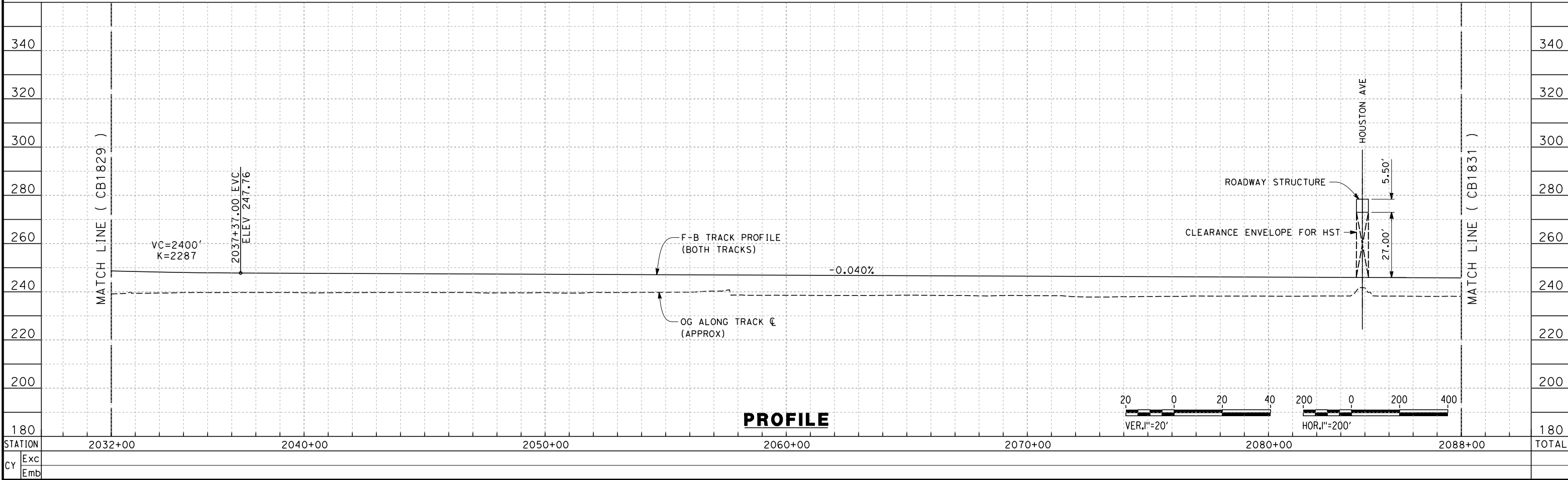
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DATE 12/31/13

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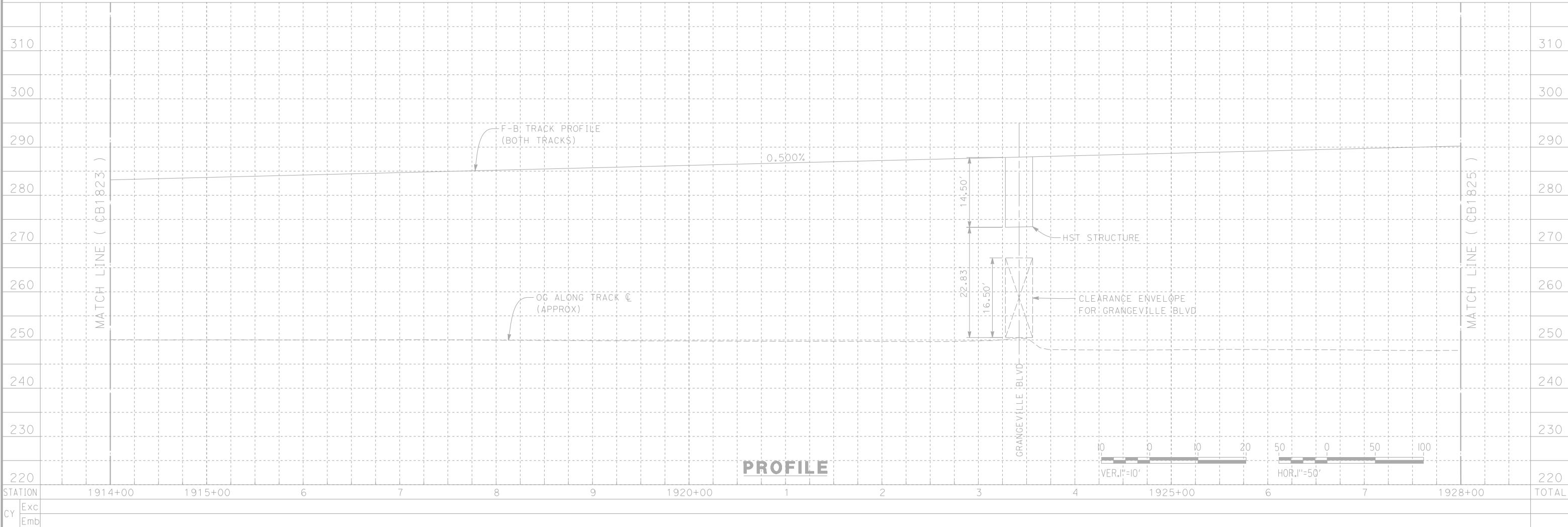
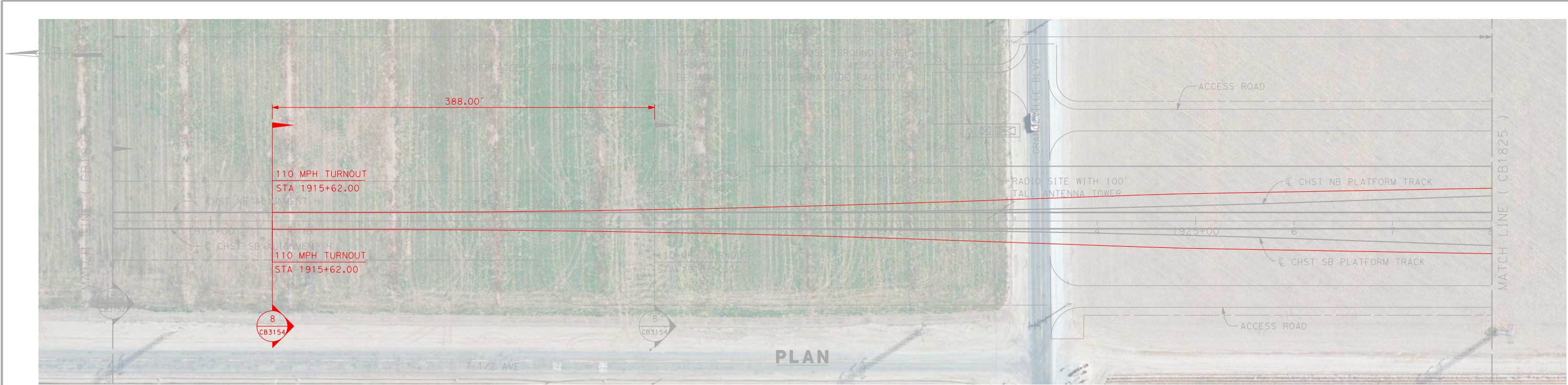


CALIFORNIA HIGH-SPEED TRAIN PROJECT  
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HANFORD SUBSECTION  
ALIGNMENT H  
STA. 2032+00 TO 2088+00  
PLAN AND PROFILE

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Appendix B – Option 3 Design Exhibits CB1824 through CB1830



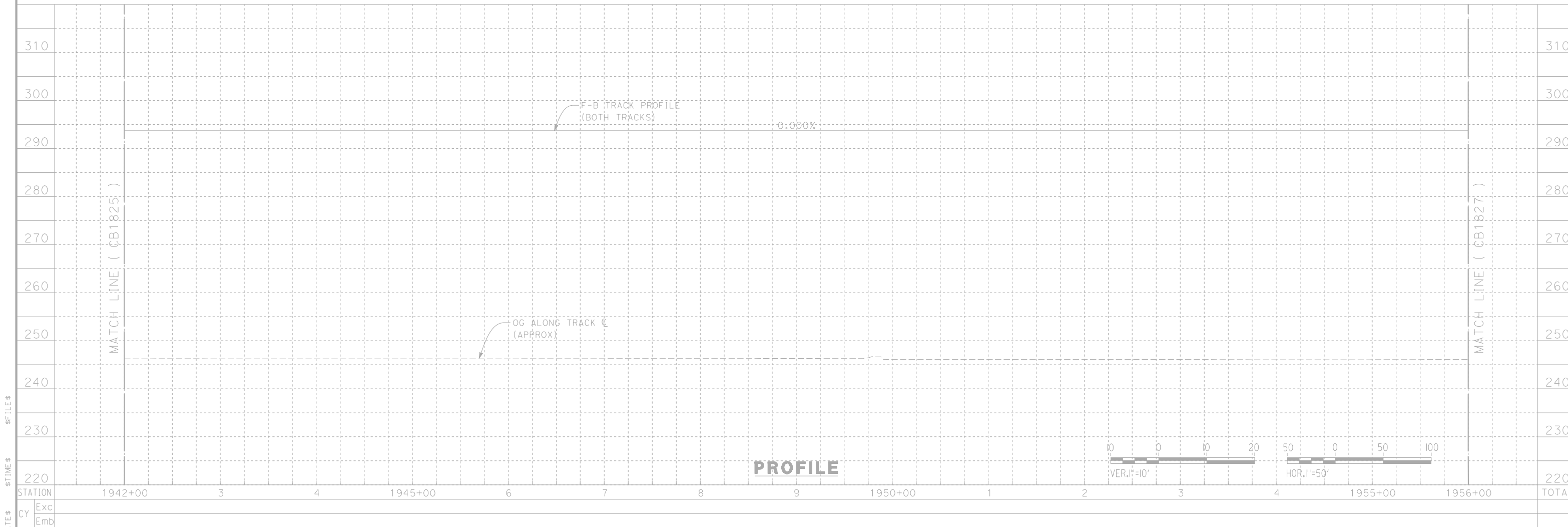
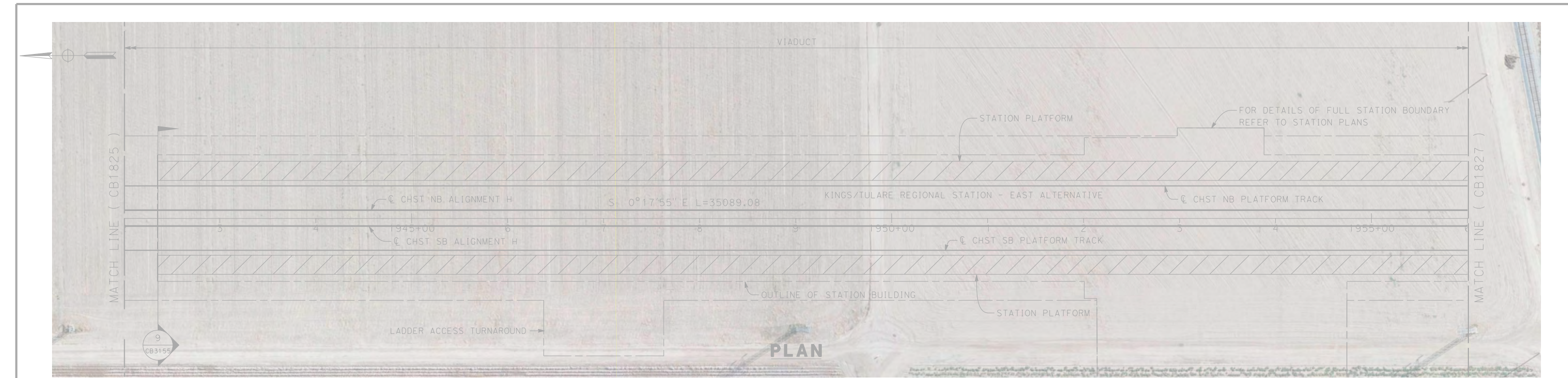


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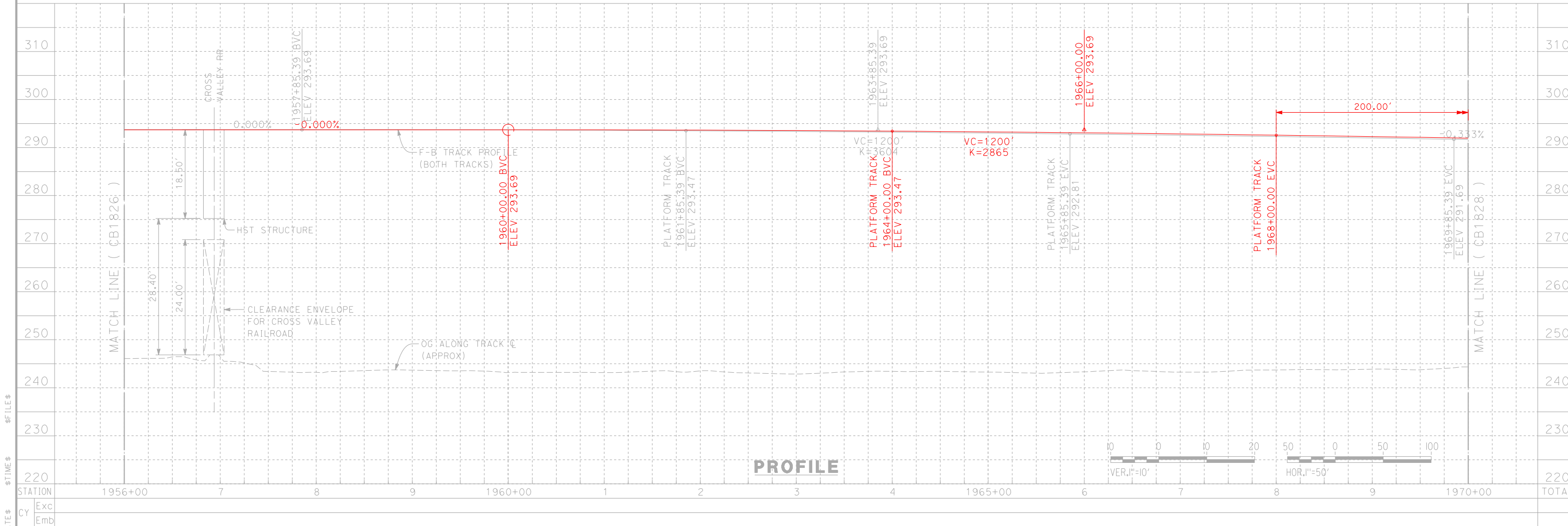
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DRAWN BY J. BORGHESI		
CHECKED BY K. SEYMOUR		
IN CHARGE R. COFFIN		
DATE 12/31/13		 CALIFORNIA HIGH-SPEED RAIL AUTHORITY

<b>CALIFORNIA HIGH-SPEED TRAIN PROJECT FRESNO TO BAKERSFIELD</b>	
HANFORD SUBSECTION ALIGNMENT H STA. 1942+00 TO 1956+00 PLAN AND PROFILE	

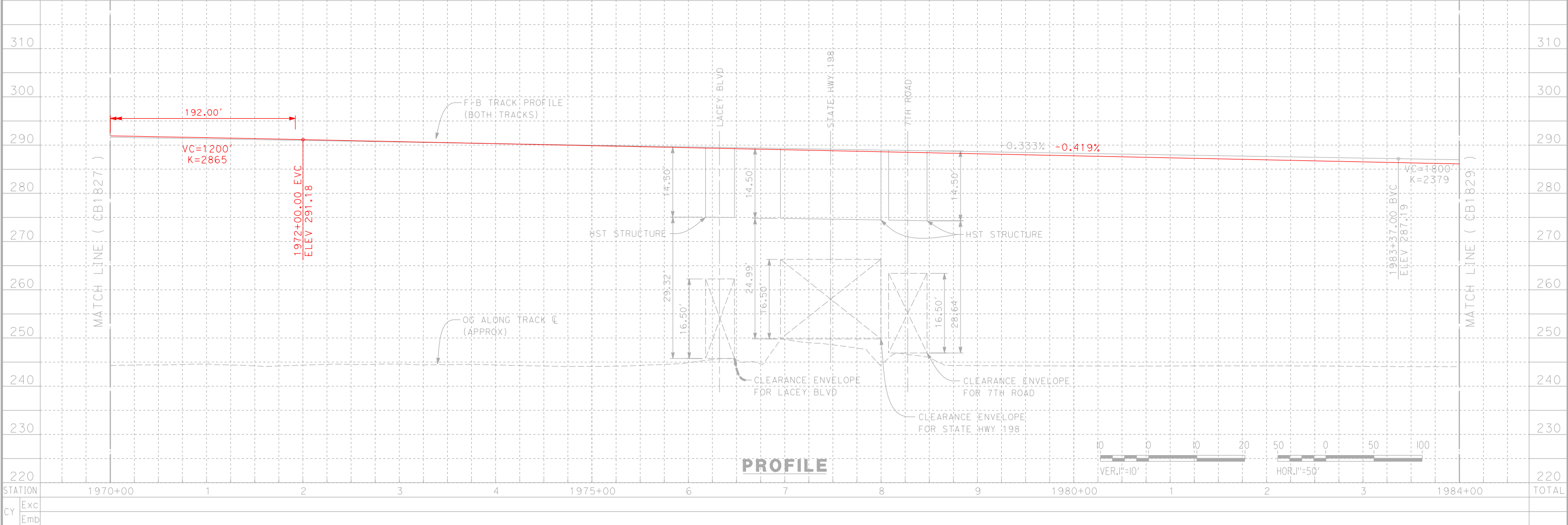
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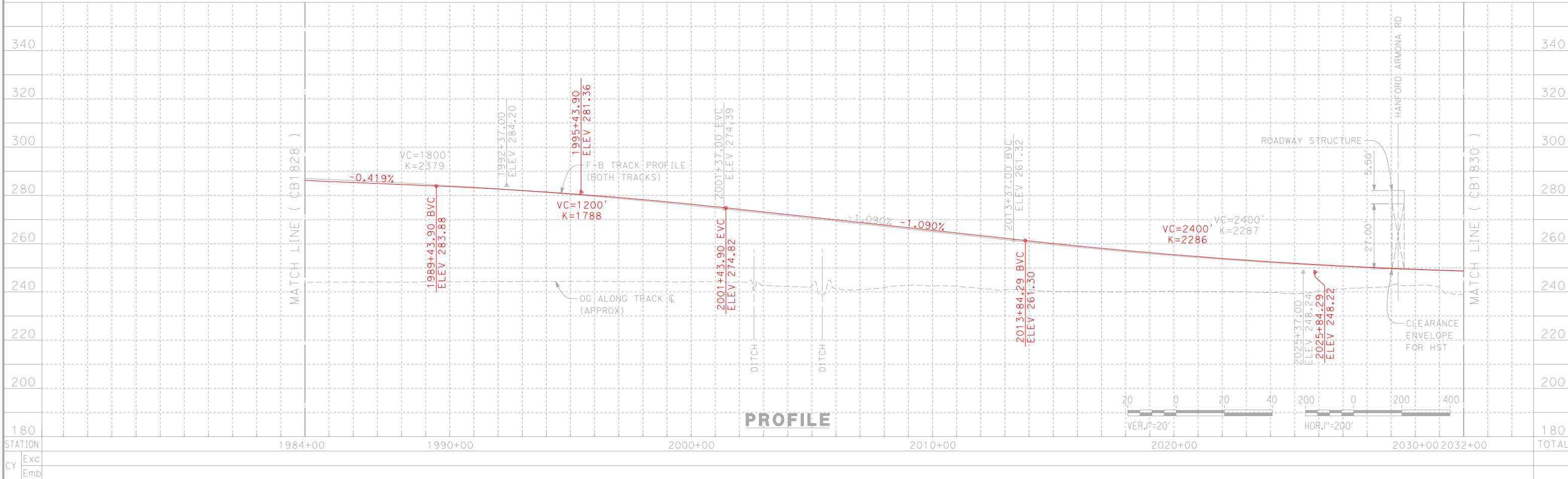
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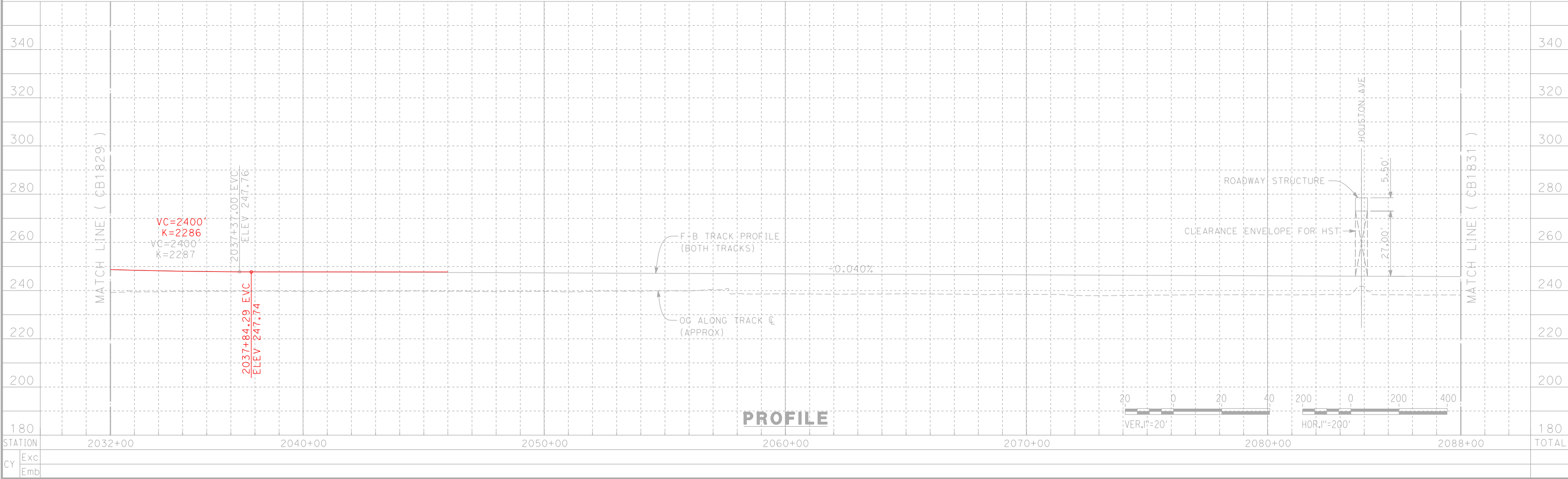
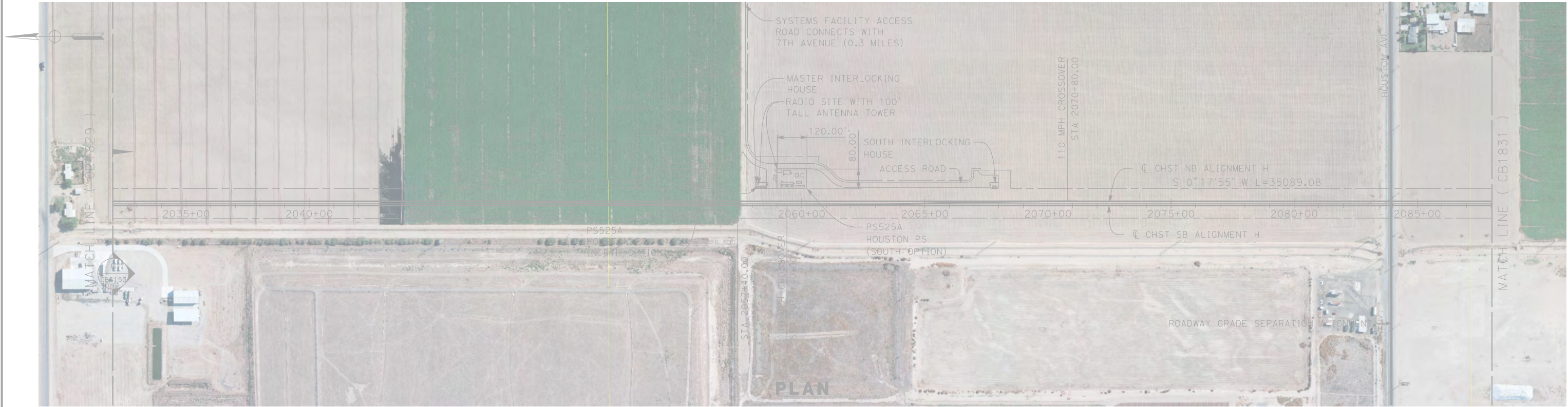
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# CALIFORNIA HIGH-SPEED RAIL PROGRAM DESIGN VARIANCE REQUEST



**DVR NO:** 0016 **DVR TITLE:** Viaduct Spans Greater Than 330 Feet

Prepared by: Qiyu Liu Firm: URS/HMM/Arup, a JV Company

## REVIEW

Supported by: Johnny Kuo Firm: PB

### PMT System-Level Review

Infrastructure	<input checked="" type="checkbox"/> Support DVR <input type="checkbox"/> Do Not Support	Railroad Systems	<input checked="" type="checkbox"/> Support DVR <input type="checkbox"/> Do Not Support
Operations & Maintenance	<input checked="" type="checkbox"/> Support DVR <input type="checkbox"/> Do Not Support	Rolling Stock	<input checked="" type="checkbox"/> Support DVR <input type="checkbox"/> Do Not Support
Systems Integration	<input checked="" type="checkbox"/> Support DVR <input type="checkbox"/> Do Not Support	Safety & Security	<input checked="" type="checkbox"/> Support DVR <input type="checkbox"/> Do Not Support
Engineering Manager	<input checked="" type="checkbox"/> Support DVR <input type="checkbox"/> Do Not Support	Criteria Classification:	

PMT Engineering Manager Recommendation: Recommend Acceptance. Design variance was proposed as a mitigation to the schedule risk to approval of the environmental document that would be introduced through the pursuit of a '408 permit'. Recommend acceptance of this.

PCM DB Oversight Manager Recommendation: N/A

CHSRA Engineering Mgr. Recommendation: Recommend acceptance

DVR Committee Recommendation:

## APPROVAL

Authority action: ☒ Approve ☐ Reject

Name: Ofelia P. Alcantara Title: Director of Design & Construction

Signature: [Signature] Date: 9/30/14



**CHST DESIGN VARIANCE REQUEST FORM****Part 1 – Design Variance Request Information****Title/Subject: Viaduct spans greater than 330 feet at USACE Levee Crossings****Number: URS-INF-1-0016****Revision: 1****Contract Name & Number (Final Design): HSR 06-0003****Region: Fresno - Bakersfield****Location: Kings River, Hanford, Kings County****Regional Consultant's / Third Party Design Drawing Reference: SV2262, SV2265, SV2266****Date Submitted to RMT & PMT**

PREPARED / SUBMITTED BY:

NAME: Qiyu Liu

COMPANY: URS/HMM/Arup A Joint Venture Company

SIGNATURE: 

DATE: 05/02/14



(Engineering Seal)

*\*Note design variance numbers will follow the same convention: "ABC" will abbreviate the name of the firm submitting the variance, "DEF" abbreviates the name of firm receiving the variance request, "X" is the revision number starting from 0, and the last four numbers count the number of total submittals starting from one.*

## Part 2 – Design Variance Request Information

<p><b>CHSTP DESIGN REQUIREMENT</b> Include reference to drawings, design criteria, technical memos, specifications</p>	<p>Draft TM 2.10.10 R1 dated 29 Feb 2012 has been used for the preliminary engineering design for the Fresno – Bakersfield segment of California High Speed Rail.</p> <p>Clause 6.10.3 requires the structural thermal unit not to exceed 330-feet.</p> <p>For simple spans where the supports are fixed at one end and able to slide at the other, the thermal unit is effectively equal to the span of the structure. For more complex span articulations, the sum of a number of span lengths cannot exceed 330-feet.</p> <p>Compliance with this requirement effectively limits the maximum structure span to 330-feet.</p> <p>The PMT have directed that rail expansion joints will not be permitted.</p> <p>TM 1.1.21 Clause 3.3.1 requires 15 feet desirable clearance (10 feet minimum) around any foundation for future maintenance access.</p> <p>1.</p>
<p><b>DESIGN CRITERIA REQUIRING A VARIANCE</b></p>	<p>Draft TM 2.10.10 limits the thermal unit of the structure to 330-feet in order to ensure that axial rail stresses from the movement of the structure relative to the rails fall within stated limits.</p>
<p><b>REASON FOR REQUESTING A VARIANCE</b></p>	<p>A 408 permit from the US Army Corps of Engineers (USACE) is required to allow construction of the HSR over the Kings River Complex (Cole Slough and Dutch John Cut channels). There are two procedures for gaining a 408 permit from the USACE, the “408 minor” process which is reviewed and granted at the district level of the USACE and the “408 major” process which is reviewed and granted at the national level.</p> <p>We were informed by the PMT that the “408 major” process takes a minimum of 2 years to complete and therefore does not fit the HSR program. We were consequently directed at the package 2-3 kickoff meeting (June 2013) to obtain agreement from the USACE that the proposed scheme fell</p>



	<p>within the scope of a “408 minor” process. To accomplish this, the Regional Consultant has prepared and submitted a 408 Determination memo setting out the details of the proposed scheme and demonstrating the consequences and effects on the Kings River channels that fall within the jurisdiction of the USACE.</p> <p>Agreement that the proposals fall within the scope of a “408 minor” process was obtained in a letter from the USACE which is attached at Appendix C.</p> <p>In preparing the 408 determination memo, design development was necessary to comply with a number of stipulations from the USACE. The stipulations that are relevant to the structure design are:</p> <ul style="list-style-type: none"> <li>• USACE requires a 15-foot setback of bridge foundations from the toe of the jurisdictional levee..</li> <li>• USACE requires that the introduction of viaduct pier bents into the river channels shall not change the water surface elevation of the channel under design conditions by more than 0.1-feet.</li> </ul> <p>In addition,</p> <ul style="list-style-type: none"> <li>• CFR Title 33, Section 208.10 states, No encroachment which will adversely affect the efficient operation or maintenance of the project works shall be permitted upon the rights-of-way for the levee.</li> <li>• Per USACE’s maintenance requirements documented under the Section 4-02 of the Operation and Maintenance Manual for Kings River Channel Improvement, dated December 1972, access roads to the levee shall be maintained in such condition that they will be accessible at all times to trucks used to transport equipment and supplies for maintenance and flood fighting.</li> <li>• The HSR Authority (TM 1.1.21 Clause 3.3.1) requires 15 feet desirable clearance (10 feet minimum) around any foundation for future maintenance access.</li> </ul>
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	<p>It is not possible to completely satisfy the above requirements and have a structure span that does not exceed 330-feet.</p>
<b>JUSTIFICATION FOR VARIANCE</b>	<p>The layout of the levee at the location where the HSR crosses Cole Slough and Dutch John Cut is not aligned with the main channels. The skew angle at which the HSR crosses these channels, dictates that the necessary span of the structure that satisfies both the USACE requirements and the Authorities requirements is greater than 330 feet (single span in the case of Cole Slough and two spans in the case of Dutch John Cut).</p> <p>By specifying:</p> <ul style="list-style-type: none"> <li>• a limit to the thermal length of the structure;</li> <li>• a limit to the allowable rotation of the end of the deck;</li> <li>• limits to the vertical displacement of the structure;</li> </ul> <p>TM 2.10.10 locks in a number of possibly inappropriate design assumptions that over-constrain the designer when trying to find a solution to a non-standard problem. This is because a key purpose of each of the above limits is to ensure that rail stresses are not exceeded.</p> <p>Relaxing the thermal length requirement has no material effect on the design other than allowing the designer to find a solution more easily.</p> <p>TM 2.10.10 does not prohibit the use of rail joints, and clause 3.6.1 states that the design philosophy is to avoid rail expansion joints <i>if practical</i>. However the PMT have instructed the RC to design without rail joints stating that these will not be permitted under any circumstances.</p> <p>By performing detailed PE4P analysis calculations it will be demonstrated that a 350-foot span can satisfy the other requirements of the TM without resorting to the use of a rail expansion joint. Refer to Structure calculations attached at Appendix G.</p> <p>The truss structures have been conceived as a</p>

	<p>series of triangulated spans based on a 35-foot module for the triangles. The module of 35-feet is considered to be an optimum value based on the following considerations:</p> <ul style="list-style-type: none"> <li>• The minimum height structure cross section is derived from the HSR vehicle gauge with allowance for OCL equipment this gives a height above Top-of-Rail of 27-feet. The minimum dimension from the top clearance point to the centerline of cross girders is 1.5-feet. The minimum dimension from Top-of-Rail to soffit of the truss is 6.5 feet. Therefore, the minimum height from centerline of top chord to centerline of bottom chord should be approximately 33-feet.</li> <li>• The most efficient geometrical arrangement for a truss structure is where the diagonal members form equilateral triangles. This arrangement more evenly balances the forces in the diagonal than other geometries.</li> <li>• The track is supported on the deck slab of the bridge. This slab has to span between cross girders, which should be located at <math>\frac{1}{4}</math> and <math>\frac{3}{4}</math> of the distance between truss frame nodes so that there is uniform support stiffness. This minimizes dynamic issues which can arise from variable structure stiffness. Given the deck slab thickness and cross girder depth assumed the most efficient span between cross girders is around 18-feet.</li> <li>• Therefore, given the above desirable dimensions and thicknesses a span module (node to node distance) of 35-feet was chosen to form the basis of the truss structures design.</li> </ul>
<b>PROPOSED ALTERNATIVE DESIGN REQUIREMENT</b>	<p>It is proposed that these 3 spans of the Kings River Viaduct are detailed as 350 feet between bearings.</p> <p>At Dutch John Cut two 350 foot spans is slightly greater than the minimum necessary to satisfy the levee and maintenance clearances, but fits with the design philosophy used for the other truss spans</p>

	<p>on the Fresno – Bakersfield section which are based on 35 foot increments of span.</p> <p>At Cole Slough a single 350-foot span is just able to satisfy the levee clearance requirements, though this compromises the desirable construction space allowance.</p> <p>The PE4P structures analysis includes an analysis of the two Dutch John Cut spans of Kings River Viaduct and it is intended that these calculations will demonstrate that the structure satisfies all other requirements of TM 2.10.10 with regard to track structure interaction i.e. displacements, rotations and rail stress. A copy of these calculations is attached at Appendix G.</p>
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### Part 3 – Impact Analysis

<b>OPERATIONS</b>	There are no operational impacts.
<b>MAINTENANCE</b>	There is no change to the maintenance requirements of the structure or track system.
<b>INFRASTRUCTURE</b>	The effects on the infrastructure of the HSR are expected to be negligible.
<b>RAILROAD SYSTEMS</b>	None identified
<b>RELIABILITY / FUNCTIONALITY</b>	The proposed change is not expected to have any effect on reliability of the system, nor on its functionality.
<b>THIRD PARTY (Utility, Freight, Caltrans, RR, other)</b>	None identified.
<b>SAFETY AND SECURITY</b>	None identified.
<b>DIRECT COST</b>	<p>The cost of a truss span is approximately double the cost of the standard viaduct (\$M/mile).</p> <p>The additional cost of a 350 foot span compared to a 330 foot span is therefore approximately equal to an additional 20 feet of standard viaduct.</p>
<b>OTHER</b>	None identified

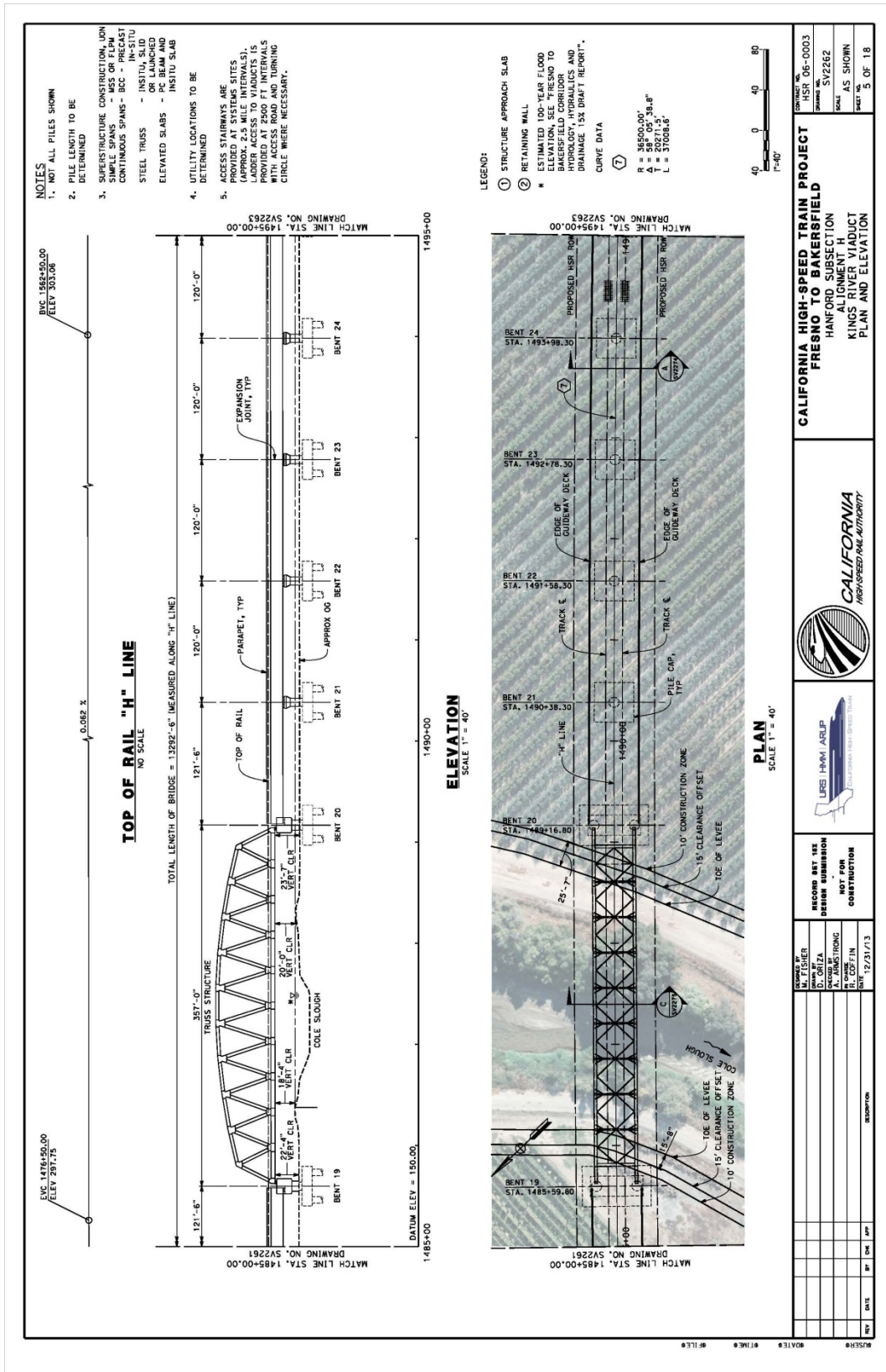
### Part 4 – Mitigation measures

<b>OPERATIONS</b>	None.
<b>MAINTENANCE</b>	None
<b>INFRASTRUCTURE</b>	None
<b>RAILROAD SYSTEMS</b>	None.

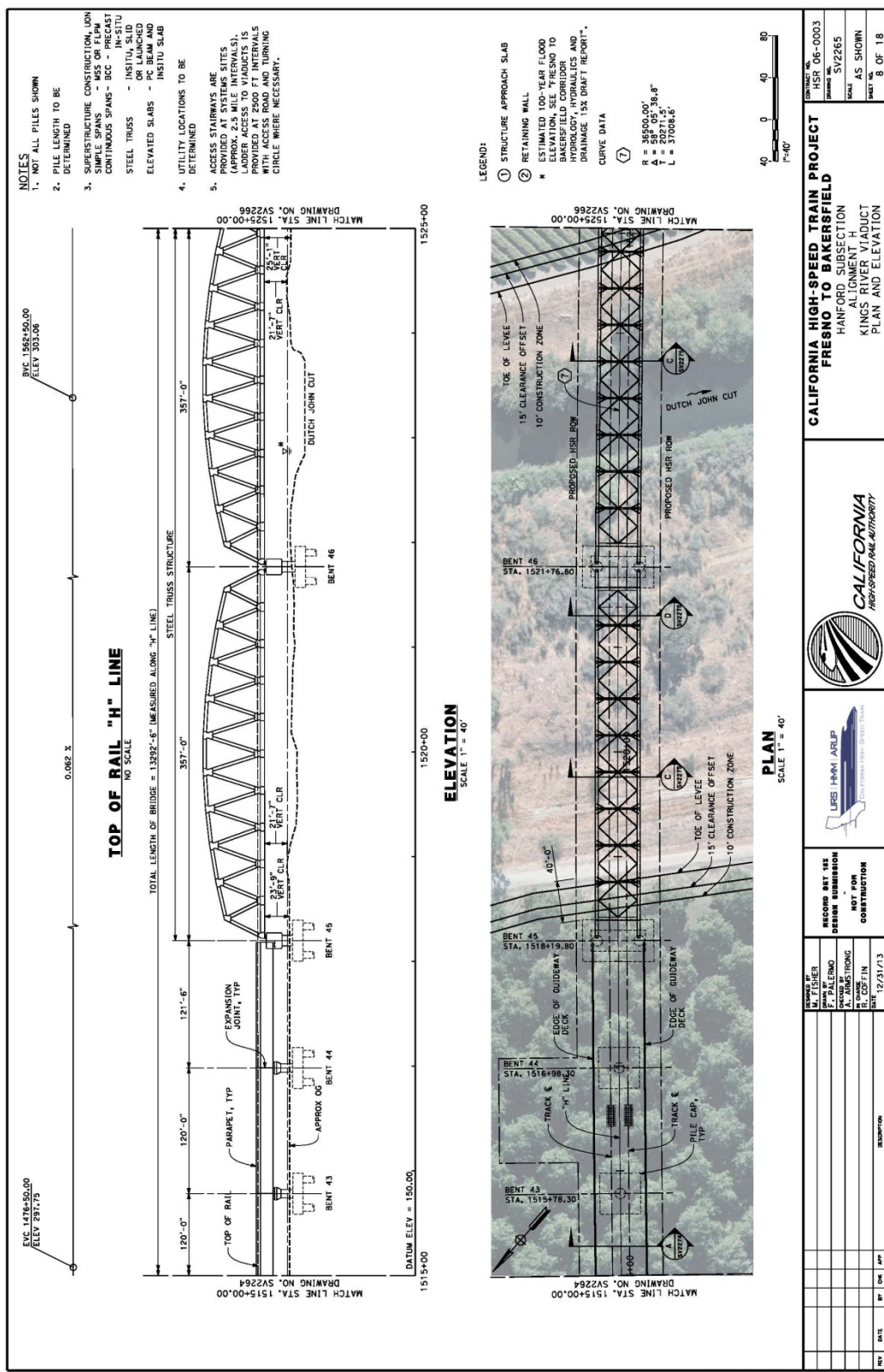
**Part 5 – List of Supporting Documentation to Design Variance Request**

<b>ANALYSIS</b>	Structures Report for package 2-3.
<b>PUBLICATION/STANDARD EXTRACTS</b>	TM 2.10.10
<b>RISK ASSESSMENT</b>	Schedule delay due to 408 major is not acceptable according to PMT.
<b>DRAWINGS</b>	SV2262, SV2265, SV2266
<b>CALCULATIONS</b>	N/A
<b>EXPERT TESTIMONIALS</b>	N/A
<b>CORRESPONDENCE</b>	Letter of Preliminary Recommendation USACE
<b>OTHER</b>	N/A

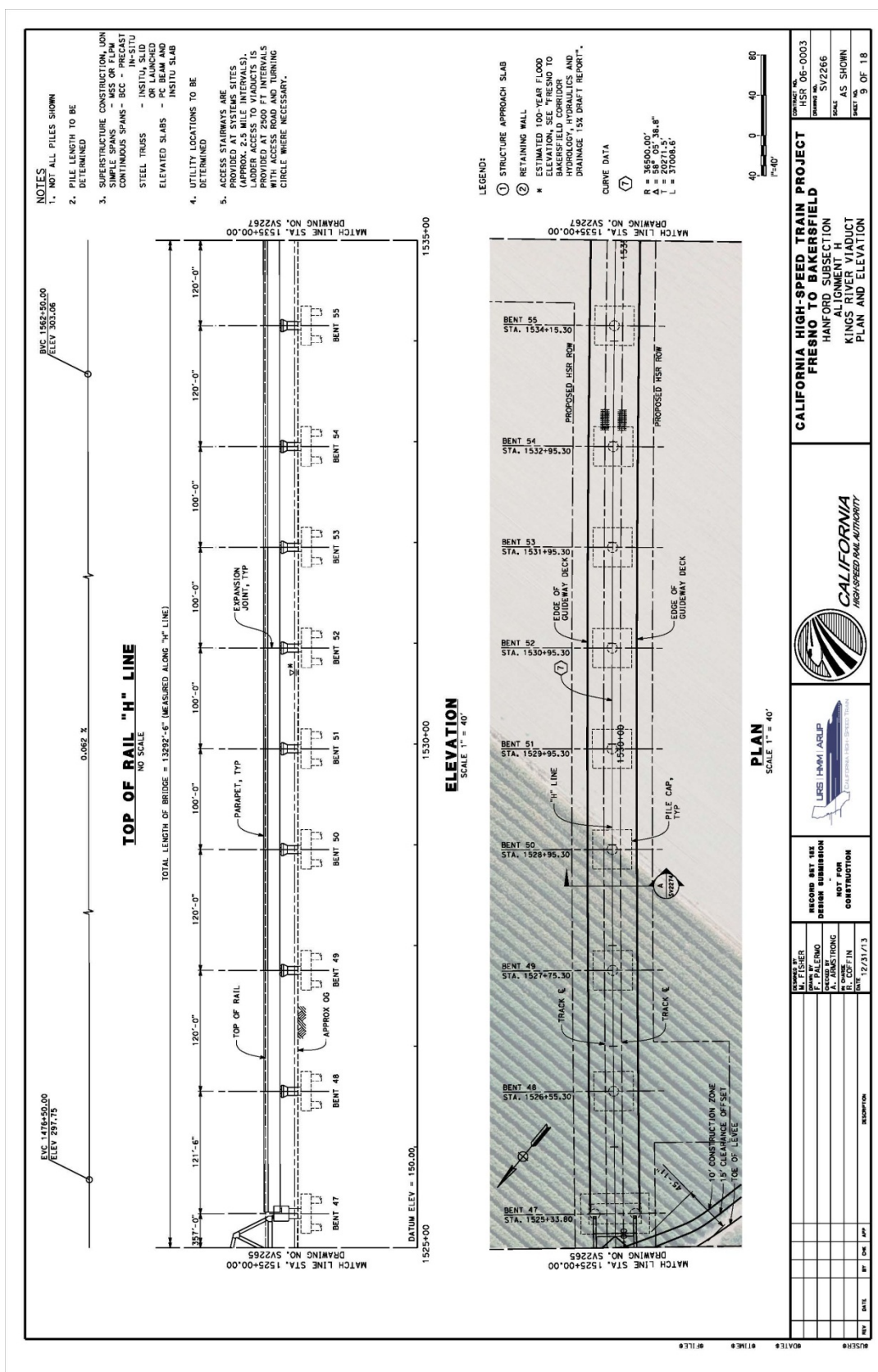
Appendix A – 15% Record Set Drawing SV2262, SV2265, SV2266











## Appendix B – TM and Directive Drawing Extracts

Extract from TM 2.10.10

### 3.6.1 General

Rail-structure interaction analysis, using modified Cooper E-50 loading, provides limits to allowable relative longitudinal deformation at expansion joints, and rail stress. Rail-structure interaction analysis is required to minimize the probability of derailment, and ensure good rideability. See Section 3.3 to determine when rail-structure interaction analysis is required at the various levels of design.

The flexibility of superstructure, bearings, columns, and foundations shall be considered in rail-structure interaction analysis.

In order to avoid underestimating deformations and rail stresses, a lower bound estimate of stiffness and an upper bound estimate of mass shall be used.

Preliminary track design philosophy per TM 2.1.5: Track Design, is to avoid rail expansion joints if practical. Thus, for preliminary design, the maximum limit from the fixed point to the free point of structure (i.e., structural thermal unit) is 330 ft.

Extract from TM 1.1.21

Use of minimum dimensions noted below is not recommended due to potential increase of construction and maintenance costs.

### 3.3.1 Structures

#### Aerial Structures

- 15-foot (Desirable), 10-foot (Minimum) wide maintenance access measured from outside edge of structure, typically the superstructure drip line but could be column or foundation for irregular structures (i.e., straddle bents) along the length of the aerial structure.
- 15-foot (Desirable), 10-foot (Minimum) wide clearance around the columns and foundations should be maintained to provide access to the columns and the foundations.

## Appendix C – Letter of Preliminary Recommendation from USACE



REPLY TO  
ATTENTION OF

DEPARTMENT OF THE ARMY  
U.S. Army Engineer District, Sacramento  
Corps of Engineers  
1325 J Street  
Sacramento, California 95814-2922

Operations and Readiness Branch

JAN 17 2014

Mark McLoughlin  
California High Speed Rail Authority  
770 L Street, Suite 800  
Sacramento, California 95814


Dear Mr. McLoughlin:

I am writing in response to your November 4, 2013, letter requesting a Section 408 determination for the crossings of the Kings River Complex within the proposed Fresno to Bakersfield segment of the California High-Speed Train ("CHST") Project. In accordance with our *National Environmental Policy/Clean Water Act Section 404/Rivers and Harbors Act Section 14 Integration Process for the California High Speed Train Program Memorandum of Understanding* dated November 2010 (NEPA/404/408 MOU), this letter is our written response for the Section 408 component of Checkpoint C.

Based on the information provided, the Sacramento District preliminarily recommends Section 408 approval for the crossing of the Kings River Complex of the CHST project between Fresno and Bakersfield. The preliminary designs show that the impacts from the proposed project are minor, low impact modifications to the flood risk reduction project and the modifications will not adversely affect the functioning of the flood protection facilities. The proposed work will cross a project operated and maintained under agreement with the U.S. Army Corps of Engineers by the Kings River Conservation District (KRCD) and appears to require a California Central Valley Flood Protection Board (CVFPB) encroachment permit. Please work with the KRCD and the CVFPB as the design is further developed. The Sacramento District will coordinate with the KRCD to ensure the proposed project will not impact the KRCD's ability to operate and maintain the Kings River Complex. Sacramento District's final recommendation will be made as part of the review of the CVFPB encroachment permit application when one is submitted. If the design changes this recommendation is no longer valid and may require approval from Headquarters, U.S. Army Corps of Engineers.

Please contact Ryan Larson at 916-557-7568 or [ryan.t.larson2@usace.army.mil](mailto:ryan.t.larson2@usace.army.mil) if you have any questions. A copy of this letter is being furnished to Mr. Steve Stadler, Deputy General Manager of Water Resources, Kings River Conservation District at 4886 East Jensen Avenue, Fresno, CA 93725 and Mr. Len Marino, Chief Engineer, Central Valley Flood Protection Board at 3310 El Camino Avenue, Room 151, Sacramento, CA 95821.

Sincerely,



Rick L. Poepelman, P.E.  
Chief, Engineering Division  
Levee Safety Officer

RFP No.: 13-57 – Addendum No. 5 - 10/09/2014

Appendix D – NEPA 404 408 Memorandum of Understanding

# MEMORANDUM OF UNDERSTANDING

Among:

United States Department of Transportation, Federal Railroad Administration  
California High-Speed Rail Authority  
United States Environmental Protection Agency  
United States Army Corps of Engineers

National Environmental Policy Act (42 U.S.C. 4321 et seq)

and

Clean Water Act Section 404 (33 U.S.C. 1344)

and

Rivers and Harbors Act Section 14 (33 U.S.C. 408)

## **Integration Process**

**for the**

**California High-Speed Train Program**

November 2010



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Appendix A. Dispute Resolution System

Appendix B. Data or Analysis for NEPA/404/408 Integration Checkpoints

Appendix C. Program Level/Tier 1 NEPA/404 Integration Letters

## Acronyms and Definitions

Authority: California High-Speed Rail Authority  
CWA: Clean Water Act  
EIS: Environmental Impact Statement  
EPA: U.S. Environmental Protection Agency  
FRA: Federal Railroad Administration  
DMP: Draft Mitigation Plan  
HST: California High-Speed Train  
LEDPA: Least Environmentally Damaging Practicable Alternative  
MOU: Memorandum of Understanding  
NEPA: National Environmental Policy Act  
RHA: Rivers and Harbors Act  
USACE: U.S. Army Corps of Engineers  
HQUSACE: U.S. Army Corps of Engineers Headquarters

“Integration Project” – a project to which this MOU applies.

“Responding Agencies” – the Signatory Agencies with resource or regulatory responsibilities: EPA and USACE.

“Signatory Agencies” – FRA, EPA, USACE, and the Authority.

“Tiering” – Tiering of an EIS refers to the process of addressing a broad, general program, policy or proposal in a programmatic EIS (Tier 1 EIS), and analyzing a narrower site-specific proposal, related to the initial program, plan or policy in a project-level Environmental Impact Statement (Tier 2 EIS).

## Section I. Introduction

The parties to this Memorandum of Understanding (MOU) are the Federal Railroad Administration (FRA), the California High-Speed Rail Authority (Authority), the U.S. Army Corps of Engineers (USACE), and the U.S. Environmental Protection Agency (EPA). The goal of this MOU is to facilitate compliance with the National Environmental Policy Act (NEPA) (42 U.S.C. section 4321 *et seq.*), Clean Water Act (CWA) section 404 (33 U.S.C. section 1344) (hereinafter "Section 404"), and Rivers and Harbors Act section 14 (33 U.S.C. section 408) (hereinafter referred to as "Section 408") processes for the project-level (Tier 2) Environmental Impact Statements (EISs) for the nine sections of the California High-Speed Train (HST) system. The integration of these processes is intended to expedite decision-making while improving the overall quality of those decisions. The purpose of this MOU is to foster agreement among the Signatory Agencies and to make it possible for the USACE to more efficiently adopt the Tier 2 EISs for which the FRA is the Federal lead agency.

Two California High Speed Train Program Environmental Impact Reports/Environmental Impact Statements (EIR/EISs) were prepared by the Authority and FRA as the first programmatic phase (Tier 1) of a tiered environmental review process. The Authority is the state lead agency under California law (California Public Utilities Code § 185000 *et seq.*) with responsibility for planning, construction, and operation of a high-speed passenger train service. As Federal lead agency for Tier 1 environmental review under NEPA, FRA worked jointly with the Authority to carry out the analyses and evaluations included in the Tier 1 EIR/EISs. The Tier 1 EIR/EISs considered the comprehensive nature and scope of the proposed HST system at the conceptual stage of planning and decision-making, including alternative transportation improvements, and potential route and station locations. FRA and the Authority's decisions on the Tier 1 EIR/EISs were to approve the HST system and select general corridors and station locations. These decisions were made in November 2005 and December 2008.

The EPA and USACE participated as cooperating agencies under NEPA in the Tier 1 environmental processes, including the development of both the Draft and Final Program EIR/EISs. As part of the process to integrate Section 404 considerations into the early NEPA planning, EPA and USACE concurred on the project purpose for the HST system, the range of alternatives considered, and the selection of the preferred corridors, routes and stations most likely to yield or contain the least environmentally damaging practicable alternative (LEDPA). These concurrence letters are incorporated in this MOU as Appendix C.

Tier 2 environmental reviews covered by this MOU will advance and expand upon the Tier 1 decisions of the Authority and FRA. The USACE has agreed to participate as a cooperating agency under NEPA in the Tier 2 environmental processes, including the development of both the Draft and Final EIR/EISs. The Tier 2 EIS/EIRs will evaluate the selected corridors and stations

in site-specific detail through further consultation with EPA and USACE regarding the Section 404 and Section 408 permitting processes, to support decision-making for any necessary USACE (1) Section 404 permit decisions to discharge dredged or fill material into waters of the U.S. and (2) Section 408 permit decisions for alterations/modifications to existing USACE projects<sup>1</sup>. As sections of the proposed HST system are advanced, these Tier 2 reviews will examine a range of HST project alternatives within corridors and at station locations selected in the Tier 1 EIR/EIS in addition to other corridors or alternatives that may be identified through public scoping, or through the availability of new information or analysis not considered during the Tier 1 phase, as well as a no action alternative. The goal of this MOU is for each Tier 2 EIR/EIS to support timely and informed agency decision-making, including but not limited to: issuance of necessary Records of Decision (RODs), Section 404 permit decisions, real estate permissions or instruments (as applicable), and Section 408 permit decisions (as applicable) for project construction, operation, and maintenance.

## Section II. Overview

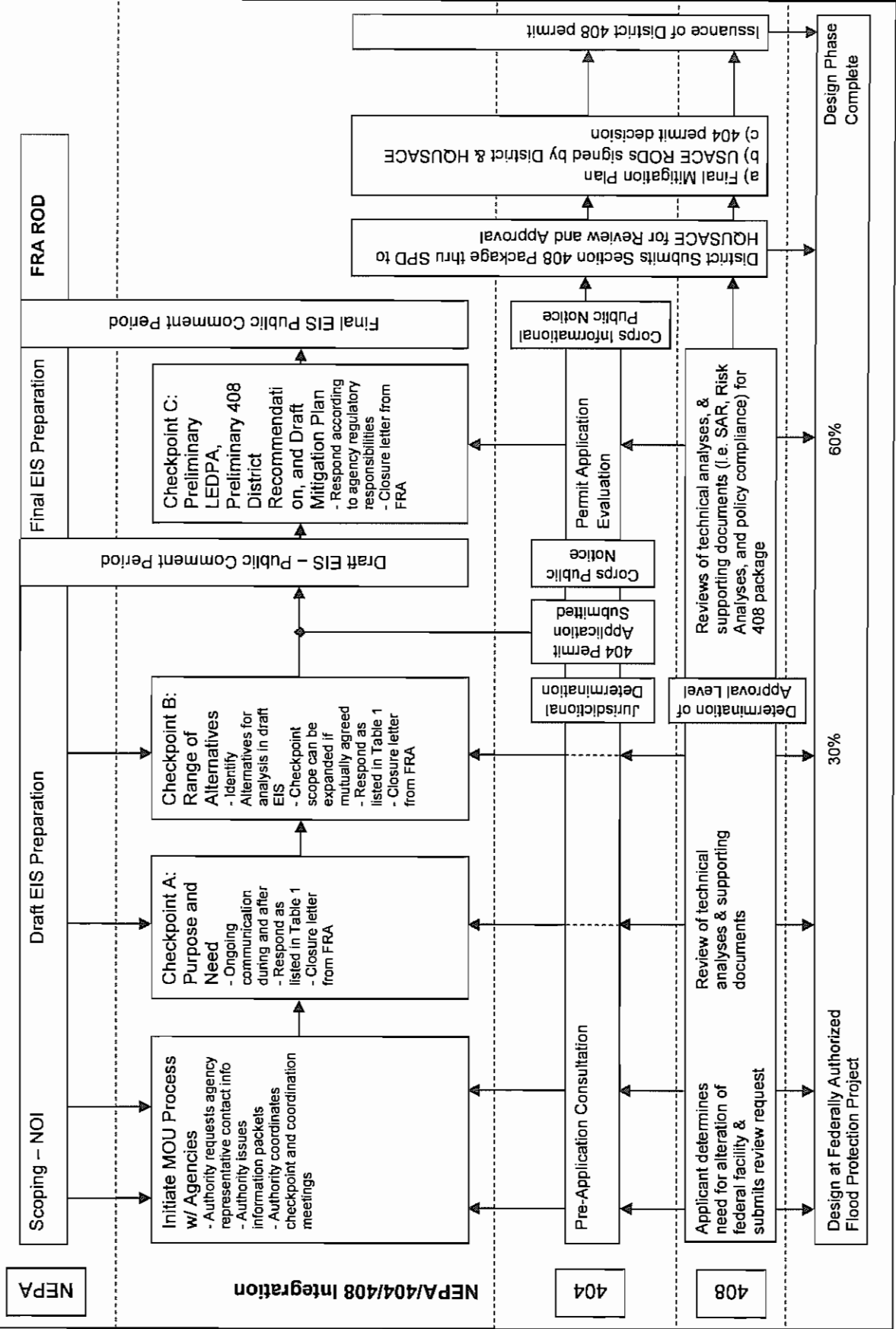
This MOU has the following components:

- 1. Procedures (Section III).** This section outlines: a) the procedures the Authority and FRA will follow in presenting information to Responding Agencies, b) procedures the Responding Agencies will follow in replying to the information, and c) the Authority's and FRA's options once a response is received. This section equates to the "who, what, when, and how" of the MOU. For a conceptual overview of this section, see Figure 1, *Overview of the California HST Program MOU Process* and Figure 2, *Coordination and Checkpoint Process*. Under appropriate circumstances, a Signatory Agency may withdraw from the integration process for a specific section of the HST system.

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<sup>1</sup> Section 408 authorizes the Secretary of the Army to approve modifications to existing USACE projects. The Assistant Secretary of the Army (Civil Works) issued a Memorandum for the Chief of Engineers, dated 16 April 2004, delegating to the Chief of Engineers the approval authority given to the Secretary of the Army in Section 408. The Chief of Engineers, in a Memorandum for the Director of Civil Works, dated 2 April 2009, delegated the approval authority to the Director of Civil Works. In addition, approval of relatively minor, low impact modifications has been further delegated to the District Engineer, by the Director of Civil Works in a memorandum dated 18 June 2010 ("HQUSACE approval"). Section 408 is the authority for all such approvals, and this MOU applies to modifications of USACE projects under the authority of Section 408 regardless of approval level.

Figure 1. Overview of the California HST Program MOU Process  
General Note – This assumes the USACE is a cooperating agency



2. **Dispute Resolution (Section IV).** This section describes the dispute resolution tools that may be used when the Authority and FRA receive disagreement, non-concurrence, or not recommend (defined below). The primary resolution tool in this agreement is the “mid-level elevation.” The mid-level elevation is a management meeting that relies on a cooperatively developed staff document, called the briefing paper, to frame the issues for resolution. Procedures for the mid-level elevation and other dispute resolution tools are also presented.
3. **Modification and Termination (Section V).** This section provides details on modification and termination of the MOU. This MOU may be modified and superseded by written agreement of all the Signatory Agencies through the execution of an amendment of the MOU.
4. **General Provisions (Section VI).** This section provides details on the legal import of this document. The MOU provides a framework for cooperation. The signatories to this MOU encourage ongoing formal and informal cooperation not specifically described in this MOU.
5. **Effective Date and Duration (Section VII).** This final section provides details on when the MOU becomes effective and the duration of the legal force and effect of the MOU.

### Section III. The NEPA/404/408 Integration Process

This section lays out the Signatory Agencies’ roles at each checkpoint, outlines the Authority’s and FRA’s options for resolving disagreement, non-concurrence, or not recommend, and describes each of the three checkpoints.

1. **Project Inclusion.** This NEPA/404/408 integration process applies to all of the HST Tier 2 EISs in which the USACE has made a project-specific decision based on the best available information confirming USACE jurisdiction pursuant to Sections 404 and/or 408 for each HST section Tier 2 EIS/EIR.
2. **Withdrawal.**
  - (a) By FRA and the Authority. For an individual HST project section, the FRA and Authority may jointly withdraw from applying this agreement upon written notice to EPA and USACE.
  - (b) By the USACE.
    - (1) If at any time after the initiation of a particular Tier 2 EIS, USACE concludes that the proposed action in that particular project section does not appear to raise significant Section 404 and/or Section 408 issues warranting

further USACE Section 404 and/or Section 408 integration, USACE will communicate that conclusion to the other Signatory Agencies in writing. Thereafter, the applicable USACE District will no longer integrate the Section 404 and/or Section 408 permitting processes and the MOU process as to that particular project section. If, subsequent to USACE's withdrawal, new information arises or the proposed project is changed in some material way that alters USACE's previous conclusion, USACE will acknowledge the new information and/or project changes in writing to the other Signatory Agencies. USACE will then once again participate in this MOU process as to the subject project section. However, USACE agrees not to revisit previous Checkpoint decisions made during the time of USACE withdrawal unless it is necessary to meet USACE's legal obligations.

- (2) If at any time after the initiation of a particular Tier 2 EIS, USACE concludes that its comments/substantive requirements are not being satisfactorily addressed in the EIS, USACE will communicate that conclusion to the other Signatory Agencies in writing. Thereafter, the USACE will initiate the mid-level elevation, and may continue elevation as needed, as provided in Section IV. Completion of the elevation process should be within 60 calendar days of receipt of written notification to initiate elevation. Following completion of elevation without resolution, the applicable USACE District will no longer integrate the Section 404 and/or Section 408 permitting processes and the MOU process as to that particular project section.

(c) By the EPA. If at any time after the initiation of a particular Tier 2 EIS, EPA concludes that the proposed action in that particular project section does not appear to raise significant NEPA or Section 404 issues warranting further EPA involvement, or that its comments/substantive requirements are not being satisfactorily addressed in the EIS, EPA will communicate that conclusion to the other Signatory Agencies in writing and will initiate mid-level elevation and may continue elevation as needed, as provided in Section IV. Completion of the elevation process should be within 60 calendar days of receipt of written notification to initiate elevation. Following completion of elevation without resolution, EPA will not participate in this MOU process as to that particular project section. If, subsequent to EPA's withdrawal, new information arises or the proposed project is changed in some material way, EPA will note the new information or project changes in writing to the other Signatory Agencies, and will once again participate in this MOU process as to the subject project section.



However, the EPA agrees to not revisit previous Checkpoint decisions, unless it is necessary due to availability of substantive new information.

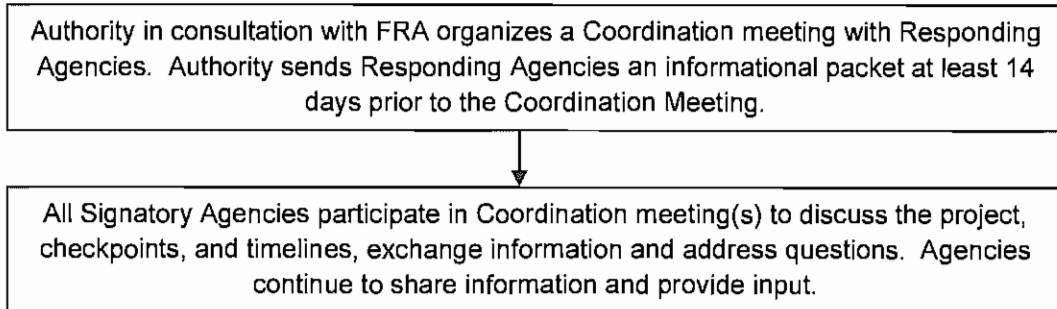
3. **Appointment of Elevation Representatives.** Each Signatory Agency will identify the appropriate representatives for elevation. This process is described in more detail in Section IV of the MOU.
4. **Focus of the MOU.** The focus of the MOU is the formal commitment of Signatory Agencies for early and continuous involvement in HST project development. The required steps are shown in Figure 1, *Overview of the California HST Program MOU Process*.
5. **FRA and Authority Responsibilities.** FRA is the Federal lead agency and is ultimately responsible for implementation of this MOU. Generally, the specific activities outlined in this section are performed by the Authority in consultation with FRA; including preparing information packets, convening meetings, addressing agency responses, and initiating the mid-level elevation briefing paper. FRA is responsible for issuing closure letters for the checkpoints.
6. **Checkpoints.** The integration process comprises three checkpoints, which punctuate ongoing coordination efforts. These checkpoints are:
  - (a) Definition of Purpose and Need for the Tier 2 HST project;
  - (b) Identification of the Range of Alternatives to be Studied in the Project (Tier 2) EIR/EIS; and
  - (c) Preliminary LEDPA Determination; USACE Section 408 Draft Response ; and Draft Mitigation Plan (DMP) consistent with 33 C.F.R. Part 332 and 40 C.F.R. Part 230 (73 FR 19,593 dated April 10, 2008).

A diagram outlining the coordination and checkpoints process is below as Figure 2. Appendix B outlines the data or analysis that should be included in the checkpoint information packets.

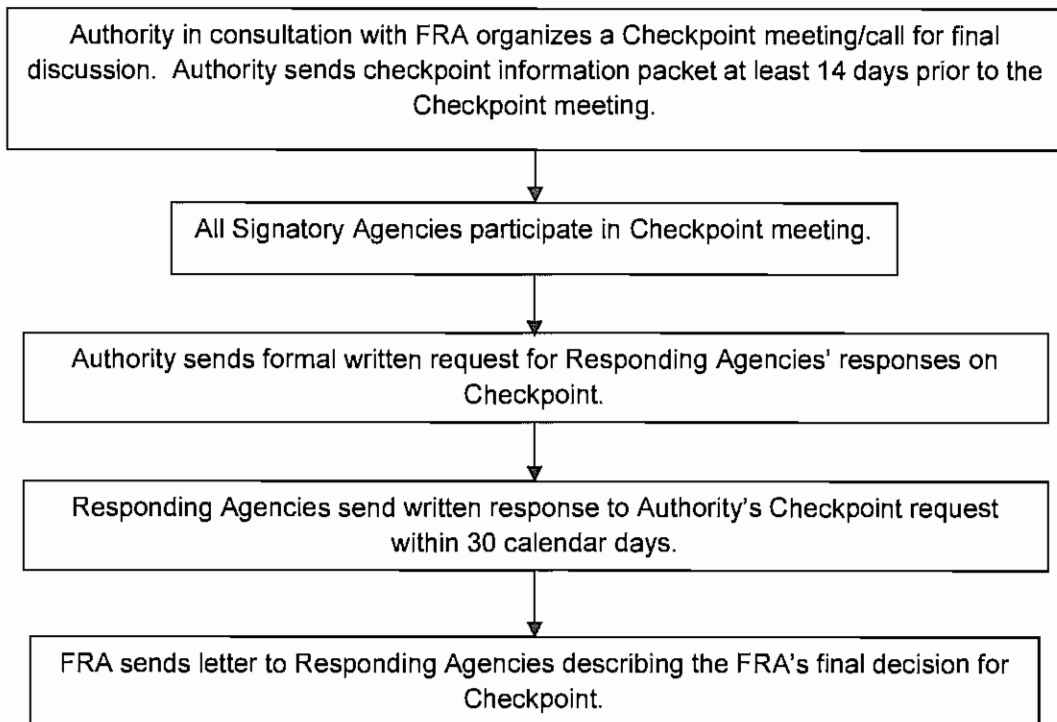
7. **Participants.** All Signatory Agencies may participate in the checkpoints. The level of participation by the agencies differs by agency and by checkpoint as described in Table 1, *Types of Response by Agency and Checkpoint*. The flow of information and decision points within each checkpoint is described in Figure 2, *Coordination and Checkpoint Process*.

**Figure 2. Coordination and Checkpoint Process<sup>2,3</sup>**

1. Start with informal coordination process for information exchange and agency input.



2. When ready for formal Checkpoint process, proceed as follows:



<sup>2</sup> If the response is Concurrence, Recommendation, or Agreement – Authority and FRA proceed to next Checkpoint.

<sup>3</sup> If response is Non-Concurrence, Not Recommend, or Disagreement with request to elevate – FRA initiates mid-level elevation.

8. **Coordination Meetings.** The integration process may involve a series of coordination meetings to exchange information about the HST project section and potential impacts. While in-person meetings are preferred, the meetings may occur by conference call or web meeting. Among other objectives, coordination meetings provide an opportunity for the Responding Agencies to identify what additional information will be necessary to make a decision about an upcoming checkpoint. Care should be taken in scheduling meetings, such that they are well-organized, are not in conflict with meetings scheduled for other HST sections, and focused on making progress towards a specific project issue or issues. Timeframes for information exchange and response will be mutually determined by the Signatory Agencies on a HST project section or alignment location.
9. **Checkpoint Meetings.** A Checkpoint is initiated when the Authority sends a checkpoint informational packet to the Signatory Agencies. The Authority will convene a “checkpoint meeting” when they determine it is appropriate and necessary to make a checkpoint decision. If a disagreement or non-concurrence is pending, this should be identified by the Signatory Agency raising the disagreement or non-concurrence at or preferably before the checkpoint meeting. Throughout this MOU process, all Signatory Agencies share responsibility for providing informal “heads up” of pending problems/potential issues as early as possible so that the other agencies can begin to prepare for a mid-level elevation or other intervention before the formal responses are made. If a mid-level elevation appears likely, the Authority should begin framing the elevation briefing paper, coordinating the development of the briefing paper with the Signatory Agencies, and scheduling the mid-level elevation during or immediately after the checkpoint meeting.
10. **Information Packet.** The Authority is responsible for sending information packets to the Signatory Agencies at least 14 calendar days or as otherwise agreed upon timeframe in advance of each checkpoint meeting. Information packets should identify critical issues of concern to the other Signatory Agencies. As the Authority is preparing the information packet, issues should be identified and communicated informally to the Signatory Agencies.
11. **Authority Request for Response and Responding Agency Responses.** Following a checkpoint meeting, the Authority will send the Responding Agencies a request for response. Upon receipt of a request for response, each agency that chooses to respond will send the response in writing or by e-mail to the Authority and FRA within 30 calendar days. The response will be an agreement or disagreement. Additionally, the USACE may submit a concurrence or non-concurrence concerning

the Preliminary LEDPA/ Draft Mitigation Plan (DMP). Also, the USACE District-level, would either preliminarily recommend or not recommend Section 408 approval at checkpoint C as specified in Table 1, Types of Response by Agency. The response terms (agree/disagree and for the USACE, concur/non-concur and/or recommend/not recommend) will reflect the regulatory responsibilities of the Responding Agencies at different points in the NEPA, Section 404, and Section 408 processes. Table 1 summarizes the only types of response an agency may give at a checkpoint.

**Table 1. Types of Response by Agency.**

Agency	Purpose & Need	Alternatives	Preliminary LEDPA/DMP	USACE Section 408 Draft Response
USACE	Agree/Disagree	Agree/Disagree	Concur/Non-concur	Recommend/Not Recommend
EPA	Agree/Disagree	Agree/Disagree	Agree/Disagree	N/A

12. **Types of Response.** As summarized in Figure 2, *Coordination and Checkpoint Process*, the Responding Agency sends a formal agreement or disagreement, (and the USACE may also send a concurrence or non-concurrence at the Preliminary LEDPA/DMP and recommend/not recommend at the USACE Section 408 Draft Response checkpoint) to the Authority, as follows:

(a) **Agreement/Disagreement.** The Responding Agency provides a written response agreeing or disagreeing with the Authority's checkpoint proposal. If there is a disagreement, then the Responding Agency's letter must identify the basis for the disagreement. If the Responding Agency does not respond within 30 calendar days, the Authority and FRA may not assume the Responding Agency agrees but may proceed with the environmental review process and EIS preparation and the Authority and FRA may initiate the mid-level elevation, and may continue elevation as needed. In the case of a disagreement, the Authority and FRA must convene a mid-level elevation.

If the mid-level elevation does not resolve the issues, the Authority and FRA at their discretion may: (i) continue to attempt to resolve the problem through

other forms of dispute resolution (such as continued elevation or use of a facilitator), (ii) may proceed without resolution, or (iii) may proceed while concurrently attempting to resolve the problem. If the Authority and FRA choose to move on, any Responding Agency may concurrently request a senior-level elevation within seven calendar days of notification by the Authority of the decision to proceed. The senior-elevation group will decide whether or not they wish to review the issue.

(b) **Concurrence/Non-concurrence by the USACE.** The USACE provides a written response concurring or non-concurring with the Preliminary LEDPA and DMP at checkpoint C. If the USACE issues a non-concurrence letter, then it must identify the basis for non-concurrence. If the USACE does not respond within 30 calendar days, the Authority and FRA may initiate the mid-level elevation, and may continue elevation as needed. If the Authority and FRA receive a non-concurrence from the USACE, the Authority and FRA may not proceed until the USACE concurs with the Preliminary LEDPA and DMP.

(c) **Recommend/Not recommend by a USACE District Office.** Checkpoint C also requires a written response from USACE District Office(s) preliminarily recommending or not recommending Section 408 approval. If the USACE District Office's response letter does not preliminarily recommend Section 408 approval, then it must identify the basis for the decision. If the USACE District Office does not respond within 30 calendar days, the Authority and FRA may initiate the mid-level elevation, and may continue elevation as needed. If the Authority and FRA receive a "not recommending" letter from the USACE District Office(s), the Authority and FRA may not proceed until the USACE District Office(s) preliminarily recommends Section 408 approval.

13. **Closure at Each Checkpoint.** At each checkpoint, the FRA, in consultation with the Authority, will send the Signatory Agencies a letter identifying the status of each issue that received a disagreement or non-concurrence. This letter will be sent before the next checkpoint, before the draft EIS is issued, before the final EIS is issued, or within 90 days after the checkpoint, whichever is sooner. If a mid-level elevation has been triggered, and resolution is reached prior to the mid-level elevation, the Authority will send notification to the Signatory Agencies.

14. **Mid-level elevation.** The procedure for the mid-level elevation is described in Section IV.

#### Section IV. Elevation Procedures and Other Region-Specific Dispute Resolution Tools

Elevation, as necessary, is encouraged. The elevation process is intended to resolve issues quickly, and to maintain constructive working relationships. This section provides an overview of the HST project section or alignment location specific dispute resolution tools available under this MOU. Detailed guidance and recommendations are available in Appendix A. In keeping with the spirit of the integration process, nothing in this section precludes any other traditional or nontraditional approaches to dispute resolution.

1. **Flexibility.** The specific dispute resolution tools are intended to be expeditious, practical, respectful, and accessible. All the tools are available at any point on a voluntary basis. However, the mid-level elevation is required for disagreements or non-concurrences. For these, the briefing paper should be used as described in Appendix A. The mid-level elevation may be used any time (including outside the checkpoints) all the Signatory Agencies agree it would be effective.
2. **Representatives for Elevation.** When the FRA initiates the NEPA/404/408 integration process, it will request that each Responding Agency initiate its internal actions for preparing to engage in the elevation process, including the review of the briefing paper and confirmation of the appropriate mid-level and senior-level representatives who have been identified to speak for their agency (Appendix A). The senior-level representative should include the top regional/state decision-maker for each agency, or his/her designee.
3. **The Mid-level Elevation.** The mid-level elevation is a tool to resolve disagreement or non-concurrence at a checkpoint. Though the Responding Agencies should have given the Authority and FRA informal notice prior to and at the checkpoint meeting, the formal trigger for a mid-level elevation is the receipt by the Authority and FRA of a letter of disagreement or non-concurrence or non-recommendation as described in Section III.12(b),12(c), and 12(d) above or a letter requesting formal elevation to resolve an issue(s). Upon receiving the letter, the Authority has 30 calendar days to convene a mid-level elevation. Convening a mid-level elevation requires the Authority to:
  - (a) Notify and schedule the managers who will resolve the dispute and the staff who will brief them;
  - (b) Coordinate, develop, and distribute an elevation briefing paper; and
  - (c) Arrange for and fund a neutral facilitator, as necessary.
4. **Briefing Paper.** A cooperatively prepared briefing paper is a key component of the mid-level elevation and is recommended for subsequent elevation to senior

managers if the latter elevation is determined to be necessary. The briefing paper should be sent by the Authority to the mid-level managers along with a draft agenda at least 10 calendar days prior to the mid-level elevation. The briefing paper should follow the format as discussed in Appendix A.

5. **Senior-level elevation.** If the mid-level elevation does not result in resolution, the involved Signatory Agencies may raise the issue to the senior management. Eventually, an issue may need to enter a more formal dispute resolution process organized by the FRA.

## Section V. Modification and Termination

### 1. **Modification.**

- (a) Any Signatory Agency may propose modifications to this MOU.
- (b) Proposals for modification of timelines or methods for a specific HST project section or to the MOU will be circulated to all Signatory Agencies for review and comment. The agencies will have 30 calendar days from receipt of the proposed modification(s) to submit comments. Upon written acceptance of a proposal by all Signatory Agencies, the Authority will circulate an MOU amendment for execution.
- (c) The amended MOU will become effective 15 calendar days after execution by the last Signatory Agency and will supersede any previous version of the MOU.

2. **Termination.** Any Signatory Agency may terminate participation in this MOU upon 30 days written notice to all other Signatory Agencies.

## Section VI. General Provisions

1. The NEPA/404/408 integration process does not include all environmental review and permitting requirements. FRA as the Federal lead agency, in conjunction with the Authority as the state sponsoring agency, is responsible to determine purpose and need and the range of alternatives for analysis in NEPA documents, and is responsible for issuing the draft and final EIS and supporting documents in compliance with NEPA. The EPA has authority under the Clean Air Act section 309 to review and comment on the NEPA documents of other Federal agencies. This is independent of EPA's role in the NEPA/404/408 integration process. Specific approvals not addressed by this MOU include, but are not limited to, the following: any real estate permissions, Endangered Species Act Section 7 compliance, CWA



Section 401 water quality certification, Coastal Zone Management Act consistency determination, National Historic Preservation Act Section 106 compliance, and Department of Transportation Act Section 4(f) compliance.

2. Regulatory and resource agency participation in this process does not imply endorsement of all aspects of a specific HST project section. Nothing in this MOU is intended to diminish, modify, or otherwise affect the statutory or regulatory authorities of the Signatory Agencies.
3. Documents, data, maps, and other information provided pursuant to this MOU may be pre-decisional (intra-agency or inter-agency memoranda or letters) or privileged FRA, Authority, EPA, or USACE information, or information that is prohibited from disclosure pursuant to applicable law. For public requests of such information, under the Freedom of Information Act or otherwise, the releasing party will notify the other Signatory Agencies and provide an opportunity to comment on whether the information is pre-decisional, privileged, or prohibited from disclosure by applicable law. To the extent permissible by law, any recipient of this information agrees not to transmit or otherwise divulge this information without prior approval from FRA, Authority, EPA, or USACE as appropriate.
4. A Signatory Agency's participation in the integration process is not equivalent to serving as a cooperating agency as defined by regulations promulgated by the Council on Environmental Quality, 40 C.F.R. Part 1500, which is a separate process established through a formal written agreement from a Signatory Agency to the Federal lead agency.
5. As required by the Anti-deficiency Act, 31 U.S.C. Sections 1341 and 1342, all commitments made by Federal agencies in this MOU are subject to the availability of appropriated funds. Nothing in this MOU, in and of itself, obligates Federal agencies to expend appropriations or to enter into any contract, assistance agreement, interagency agreement, or incur other financial obligations that would be inconsistent with agency budget priorities. The non-Federal signatory to this MOU agree not to submit a claim for compensation for services rendered to any Federal agency in connection with any activities it carries out in furtherance of this MOU. This MOU does not exempt the non-Federal parties from Federal policies governing competition for assistance agreements. Any transaction involving reimbursement or contribution of funds between the parties to this MOU will be handled in accordance with applicable laws, regulations, and procedures under separate written agreements.

The obligations under this MOU of the State of California or its political subdivision are subject to the availability of appropriated funds. No liability shall accrue to the State of California or its political subdivision for failure to perform any obligation under this MOU in the event that funds are not appropriated.

6. This MOU does not confer any right or benefit, substantive or procedural, enforceable at law or equity, by a party against the United States, its agencies, its officers, or any person.
7. If all Signatory Agencies decide not to participate in this agreement any further, the FRA will provide written documentation to all Signatory Agencies that the MOU is terminated.
8. The parties recognize that EPA and the USACE have existing agreements on the processes that those agencies will use to collaboratively and expeditiously resolve specific issues in Section 404 permit program implementation. Nothing in this MOU is intended to supersede, expand, or void any part of those existing agreements. If either the EPA or the USACE initiates any dispute resolution mechanism under these existing agreements as to an issue arising in the context of the HST system, the initiating agency will communicate that fact to the other parties of this agreement in writing. EPA and the USACE will keep the other Signatory Agencies of this MOU apprised of any developments in the dispute resolution process.

#### Section VII. Effective Date and Duration

This MOU will become effective on the date of signature by the last party. This MOU shall remain in force, subject to Section II.2, until whichever of these events occurs first: a) the USACE issues the last of the RODs, Section 404 permit decisions, and 408 permit decisions, required for the last Tier 2 EIS necessary to complete the HST System; or b) the MOU is terminated pursuant to Section V.2.

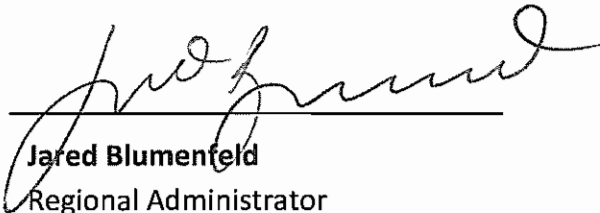
IN WITNESS WHEREOF, this MOU is executed by the Federal Railroad Administration, California High-Speed Rail Authority, U.S. Army Corps of Engineers, and the U.S. Environmental Protection Agency, acting by and through their respective authorized officers.



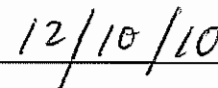
**Scott F. "Rock" Donahue, P.E**  
Brigadier General, U.S. Army  
Commanding



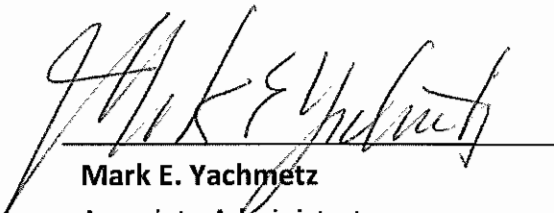
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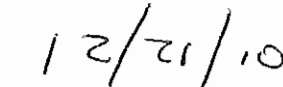
**Jared Blumenfeld**  
Regional Administrator  
U.S. Environmental Protection Agency, Region IX



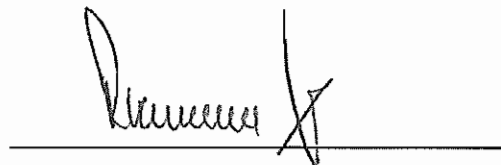
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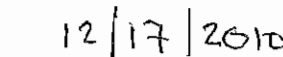
**Mark E. Yachmetz**  
Associate Administrator  
Office of Railroad Policy and Development  
Federal Railroad Administration



Date



**Roelof van Ark**  
Executive Director  
California High-Speed Rail Authority



Date

## Appendix A. Dispute Resolution System

### The Briefing Paper

At every mid-level elevation, staff of each of the Signatory Agencies involved in the dispute will prepare a cooperative briefing paper. This paper may also be used for senior-level elevations. The briefing paper should offer salient information precisely framing the issues requiring resolution. The briefing paper:

- Encourages neutral presentation of issues, rather than polarizing;
- Maximizes the likelihood of resolution of at least some of the issues as staff prepare for the elevation;
- Ensures that the problem statement is robust, clear, and focused; and
- Fosters improved communication.

The briefing paper should be short and will need to be developed quickly – in 21 calendar days in most cases. A format for the briefing paper is presented below.

The issues to be addressed in the briefing paper should be framed at the checkpoint meeting. The Authority should begin the first draft shortly after the checkpoint meeting. Once the Responding Agencies reply formally to the Authority's request for responses, the Authority will complete the first draft of the briefing paper and send it to all the Signatory Agencies. A person from each agency responsible for the development of the briefing paper (a point of contact) should be identified informally at the checkpoint meeting, if possible, and formally in the response letter.

Upon receipt of the first draft, any of the Signatory Agencies may contribute to the briefing paper; use of the "Track Changes" tool in Word is preferred. A single set of changes will be sent by each agency's point of contact. The Authority may either accept the changes or move them to one of the "alternate" columns, and this document becomes the second draft. The Authority then distributes the second draft to the contributors and makes requested changes prior to sending a final document to the elevation decision-makers. There may be other iterations as needed and as the schedule allows.

Informal telephone conversations and e-mails should occur in support of all stages of the development of the briefing paper.

The specific timing for reviews, changes, and incorporation of changes may be modified by mutual agreement at or shortly after the checkpoint meeting, or whenever a mid-level elevation is first anticipated.

When the FRA initiates the NEPA/404/408 integration process, it will request that each Responding Agency initiate its internal actions for preparing to engage in the elevation process, including the review of the briefing paper and confirmation of the appropriate mid-level and senior-level representatives who have been identified to speak for their agency. The following are the identified mid-level and senior level representatives for each agency.

<b>Signatory Agency</b>	<b>Mid-level Elevation</b>	<b>Senior-level Elevation</b>
EPA	Division Director, Communities & Ecosystems Division	Regional Administrator of Region IX
USACE	District Commander	South Pacific Division Commander
FRA	Chief, Environment and Systems Planning Division	Associate Administrator, Railroad Policy and Development
Authority	Deputy Director	Executive Director

Figure A-1. Sample Briefing Paper

Project Name:		
Checkpoint:		
As the briefing paper is developed, alternate views that are not easily incorporated into the main body of the document can be dropped into columns on the right, and sized to fit in whatever way makes graphic sense. If the alternate view columns prove to be unnecessary, they can be taken out.	Alternate comments	Alternate comments
Background:		
<p>Issue 1: A Word or Phrase Naming the Issue. A succinct summary. Ideally, the list of issues will have been sketched out at the checkpoint meeting.</p> <p>QA: At the end of the summary of the issue, end with a question. This helps keep the decision-makers in the elevation focused.</p> <p>QB: Sometimes within an issue there is more than one question. For instance, there might be a question about whether an alternative is practicable or not, and there might be a separate question about which agency ought to make the determination on a specific technical issue.</p>		
Issue 2: A Word or Phrase Naming the Second Issue. A succinct summary.		
Q:		
Resolution:		
Issues Still Requiring Resolution:		
<p>Dates: Checkpoint meeting ____/____/____;</p> <p>Request for Response ____/____/____;</p> <p>Negative assessment or non-concurrence ____/____/____;</p> <p>Mid-level elevation; ____/____/____;</p> <p>Resolution ____/____/____.</p>		

### **Use of Facilitators**

The use of a facilitator may be an effective way to conduct a coordination meeting, checkpoint meeting, or elevation. Here are some approaches to involving facilitators that have been useful in the past:

*The process for hiring the facilitator should be as collaborative as practicable.* Involving agencies in the selection of a facilitator sets a neutral tone from the outset.

*Involve the facilitator in the development of the agenda.*

*Strike the right balance in terms of substantive knowledge.* A facilitator who has to stop and ask 'What is section 404 of the CWA?' is likely to delay resolution. Yet it is not necessary to find someone who knows the details of the HST process and each of the statutes and all of the regulations. It is probably more important that the facilitator be truly skilled at facilitation and have a general natural resources background.

*Timely retention of a facilitator.* Identifying and hiring a facilitator on short notice can be a challenge, but not an insurmountable one. Many of the agencies participating in this MOU have trained facilitators who could assist with the meeting or elevation. The U.S. Institute for Environmental Conflict Resolution maintains a roster of qualified facilitators who can be easily accessed by many federal agencies.



## Appendix B. Data or Analysis for NEPA/404/408 Integration Checkpoints

The following sets forth the data or analysis that should be provided at each checkpoint.

### **Checkpoint A: Purpose and Need**

The purpose and need statement should be broad enough to allow for consideration of a range of reasonable and practicable alternatives that are commensurate with the level of environmental impacts, but specific enough that the range of alternatives may be appropriately focused in light of the Tier 1 EIS/EIR programmatic decisions. The needs of the project should take scoping comments into account and be presented in terms of quantified deficiencies (i.e., existing deficiencies, future without-project deficiencies, or both) as compared to some relevant local, regional, state, or national standard or goal. FRA as the NEPA lead Federal agency is given substantial deference in determining its NEPA purpose and need statement. The purpose and need statement should be coordinated with appropriate agencies. The EPA and USACE agreement on the purpose and need statement will indicate that the information is sufficiently clear and detailed for the USACE to formulate the basic and overall project purpose pursuant to the CWA section 404(b)(1) Guidelines and Section 408, and can be used with confidence in the next stage.

### **Checkpoint B: Identification of Project Alternatives for Analysis in the DEIS**

In letters dated July 22, 2005, the EPA and the USACE concurred with the alternative most likely to contain the LEDPA for the statewide California HST Project. In addition, the USACE concurred in a letter dated May 8, 2008 and EPA concurred in a letter dated April 30, 2008 that the Pacheco Pass, San Francisco, and San Jose Termini is the program alternative likely to contain the LEDPA for the HST system from the Bay Area to the Central Valley. Copies of these letters are incorporated in the MOU as Appendix C. The decisions were commensurate with the level and breadth of the environmental data made available to the USACE and EPA at that time and were focused on those Section 404 and NEPA issues that were ripe for consideration. However, the prior Tier 1 concurrences do not obviate the need for FRA and the Authority to fully comply with all requirements of the CWA section 404(b)(1) Guidelines (40 C.F.R. Part 230) during the preparation of subsequent Tier 2 (project-level) EISs nor do they fulfill the USACE's public interest review process and determination pursuant to 33 C.F.R. Part 320.4(a). New information or changes in project decisions should be carefully considered when developing alternatives and may require Tier 1 alternatives to be revisited, if necessary.

Standardized alternatives evaluation criteria will be used for each HST project EIR/EIS process in order to consider a reasonable range of alternatives and to identify those alternatives that satisfy the project purpose and need, and overall project purpose that are feasible and practicable, and avoid or minimize environmental impacts. HST Project alternatives will be appropriately analyzed and documented in accordance with the following:

- 1) A detailed project description of the alternatives with engineering layouts on aerials and cross sections.

- 2) A brief discussion of the reasons for considering but eliminating project-level alternatives from further detailed study should be provided. An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purpose(s).
- 3) Summary presentation of environmental resources and constraints using data gathered and evaluated that should include:
  - a. A delineation of potential special aquatic sites and waters of the U.S. should be provided through the use of remote sensing imagery (color infrared aerials and digital raster graphics or digital elevation models) overlaid with existing data; with photographs or video of each feature, maps showing the location of each feature, and a preliminary assessment of functions and services by indicating whether the feature exhibits medium to high hydrologic, water quality, and habitat integrity; whether the feature is important to associated or adjacent critical habitat, protected species, or public or protected open spaces.
  - b. Maps that show the occurrences of all associated sensitive species that have been identified within the survey area in relation to project features, including federally listed endangered and threatened species and designated critical habitat including the size of the populations in terms of numbers of individuals and habitat occupied. The maps should also include other relevant data such the 100-year floodplain, biological reserves or preserves, wildlife crossings, and habitat conservation planning core and linkage areas.
  - c. Maps clearly depicting lands, easements and rights-of-way necessary for a proposed alteration or modification to a Federally authorized Project.

**Checkpoint C: Preliminary LEDPA Determination**

- 1) The project activities should be clearly depicted by providing:
  - a. Description and plans detailing temporary impacts including: grading, clearing and grubbing, and water diversion activities; location of construction staging areas, access areas, and borrow and storage sites; and the duration of these activities;
  - b. Descriptions and plans detailing permanent impacts including: location, size, and depth of structures or fill material; quantity and composition of fill material; changes in topography and vegetation; and
  - c. Description and/or plans of operational or long-term activities.
- 2) The impacts must be clearly depicted and accurately characterized by providing a detailed description and quantification (in estimated acres of impacts) of the project temporary, permanent, and indirect and cumulative impacts on special aquatic sites and other waters of the U.S., including the type of impact (e.g., habitat removal, fragmentation, introduction of exotic species) and its magnitude. These effects must be evaluated at the appropriate local

or regional context. Any avoidance and minimization measures in design should be well-documented and quantified in terms of acres of impacts avoided associated with each avoidance or minimization measure.

- 3) A detailed (rapid assessment or better) assessment of the functions and services of special aquatic sites and other waters of the U.S. is necessary to provide adequate analysis of impacts. The assessment should determine which functions are performed by the wetland/waters, the services of those functions, and how the project will affect the continued performance of the identified functions. The precise assessment methodology for characterizing the functions and services of aquatic resources should be determined in close consultation with the USACE.
- 4) Consideration of temporary, permanent, and indirect and cumulative impacts on biological resources, including sensitive species including federally listed endangered and threatened species and designated critical habitat.
- 5) Consideration of temporary, permanent, and cumulative impacts on cultural resources, including sites listed on the National Register of Historic Places or National Historic Landmarks.

#### **Checkpoint C: Draft Mitigation Plan**

- 1) Compensatory mitigation plan to offset permanent losses of waters of the U.S., including a statement describing how temporary losses of waters of the U.S. will be minimized to the maximum extent practicable; or, justification explaining why compensatory mitigation should not be required.
  - a. Any compensatory mitigation proposed should be based on the watershed approach and should comply with the final mitigation rule issued by the EPA and the USACE on April 10, 2008, and USACE-issued Habitat Mitigation and Monitoring Guidelines.
  - b. A description of any compensatory mitigation proposed should specify the amount, type, and location of compensatory mitigation, including any out-of-kind compensation, or indicate the intention to use an approved mitigation bank or in-lieu fee program.
  - c. If the mitigation proposal includes project activities to create, restore, and/or enhance waters of the U.S. and aquatic ecosystems, a prospectus of candidate mitigation sites should be provided that includes:
    - i. A detailed description of proposed activities to create, restore, and/or enhance waters of the U.S. and aquatic ecosystems including the amount, type, and location;
    - ii. A jurisdictional delineation of existing features and a detailed assessment of the existing functions and services of special aquatic sites and other waters of the U.S;

- iii. A detailed assessment of the proposed functions and services of special aquatic sites and other waters of the U.S.;
- iv. Discussion of buffer areas and habitat linkages;
- v. Discussion of hydrology and hydraulic design considerations;
- vi. Listing of species to be used in carrying out mitigation;
- vii. Cost estimate and feasibility analysis;
- viii. Mitigation success criteria and monitoring methods;
- ix. Adaptive management plans;
- x. Long term maintenance and management plans;
- xi. Financial assurances; and
- xii. Long-term site protection instruments.

#### **Checkpoint C: USACE Section 408 Draft Response**

When the Authority has provided sufficient engineering and hydraulic analysis, the USACE District shall determine if the types of alterations/modifications to a Federal flood control facility would require approval by the District Engineer or by U.S. Army Corps of Engineers Headquarters (HQUSACE) under 33 U.S.C 408 (see “Determination of Approval Level” on Figure 1: Overview of the California HST Program MOU Process). If proposed alterations/modifications are minor, low impact modifications, the Authority shall coordinate with the local sponsor of the flood control facility and/or the USACE District, as appropriate. NEPA compliance is still required for minor modifications; therefore, the level of documentation should be coordinated with the USACE District or local sponsor. The District Engineer approval process under 33 U.S.C. Section 408 is not depicted in Figure 1.

If HQUSACE approval is required, the applicable USACE District shall provide review and information of the required risk analysis, safety assurance review, and policy compliance necessary to make a preliminary recommendation for each alteration or modification requiring HQUSACE approval. The Authority shall provide the safety assurance review plan and all the necessary technical analysis and supporting documentation for the following:

- 1) Risk Analysis: The Authority shall provide an analysis of the risk and uncertainty through evaluation of potential system impacts limited to the hydrologic and hydraulic parameters. Impacts will be determined by comparing performance parameters as presented in ER 1110-2-101 for the existing or base condition to the condition resulting from the project alteration/modification. The base performance conditions are defined by authorized project features. The USACE has provided technical guidance in EM 1110-2- 1619, but has yet to fully develop the guidance needed to analyze risk and uncertainty for the geotechnical and structural performance of a system. Until such guidance is developed, deterministic procedures are appropriate for demonstrating geotechnical and structural integrity under the full range of loading conditions.

2) Safety Assurance Review (SAR): Approval of the Safety Assurance Review (SAR) Plan is required by the USACE Division. When the USACE District is concurrently performing investigations that will entail a safety assurance review at the project location, the SAR for the overarching study will suffice but must be completed prior to initiation of construction. In cases where no USACE investigations are ongoing, an SAR on the proposed alteration/modification must be performed by the Authority in advance of Checkpoint C in accordance with EC 1165-2-209. The USACE District will utilize the SAR results when making a preliminary 408 District recommendation.

3) Policy Compliance: The applicable USACE District shall review and certify the legal/policy/technical and quality management of the decision document for each alteration or modification requiring HQUSACE approval.

A 60 percent or greater engineering design as well as any additional information specified in the (a) October 23, 2006, CECW-PB Memorandum for Major Subordinate Commands, SUBJECT: Policy and Procedural Guidance for the Approval of Modification and Alteration of Corps of Engineer Projects and (b) November 17, 2008, CECW-PB Memorandum from the Director of Civil Works titled "Clarification Guidance on the Policy and Procedural Guidance for the Approval of Modifications and Alteration of Corps of Engineers Projects" is required for a USACE District to provide a preliminary recommendation.



## Appendix C. Program-Level/Tier 1 NEPA/404 Integration Letters



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX

75 Hawthorne Street  
San Francisco, CA 94105-3901

July 22, 2005

Mark Yachmetz  
Environmental Program Manager  
Federal Railroad Administration  
1120 Vermont Avenue, NW, MS 20  
Washington, D.C. 20590

Subject: California High Speed Train System Programmatic Environmental Impact  
Statement Request for Concurrence

Dear Mr. Yachmetz:

The U.S. Environmental Protection Agency (EPA) is writing in response to your request of July 1<sup>st</sup>, 2005, for concurrence on the range of alternatives that are "most likely to contain" the least environmentally damaging practicable alternative (LEDPA) for the proposed **California High Speed Train System**. Following our review of the Administrative Draft of the Final Programmatic Environmental Impact Statement (PEIS) submitted to EPA on July 11, 2005, we concur that the preferred alignments and station options, as listed in the attachment, are most likely to contain the LEDPA, a requirement of Section 404 of the Clean Water Act. EPA's concurrence encompasses the preferred High Speed Train alignment and station alternatives in each of the five geographic areas of the project: Bay Area to Merced, Sacramento to Bakersfield, Bakersfield to Los Angeles, Los Angeles to San Diego via Inland Empire, and Los Angeles to San Diego via Orange County.

Through a Cooperating Agency Memorandum of Understanding (MOU) signed in July 2003, EPA has coordinated with the Federal Railroad Administration (FRA) and the California High Speed Rail Authority (CHSRA) to establish agreement on decisions made in the environmental review process and to avoid revisiting those decisions at a later date. This coordination is accomplished through the early integration of the requirements of the National Environmental Policy Act (NEPA) and Section 404 of the Clean Water Act (CWA) and EPA concurrence with decisions made at significant points in the project development.

The PEIS, or "Tier 1" evaluation, provides landscape-level analysis of potential environmental impacts. The Tier 1 process is expected to identify those alternatives that will be analyzed in detail at the "Tier 2" project-level evaluation. As outlined in the MOU, EPA's concurrence establishes agreement on those alternatives that are most likely to contain the LEDPA at this Tier 1 programmatic level and should, therefore, be advanced for further study at Tier 2. During the Tier 2 project-level environmental review, EPA will continue to coordinate with FRA and CHSRA to determine which routes are the LEDPA.

Only alternatives that are the least damaging to aquatic resources and are practicable (feasible and in light of cost, logistics, and technology) can be permitted. Through this early integration and concurrence process, EPA has provided feedback that will aide the Tier 2 project-

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level analyses. We provide the following comments associated with the determination of the routes most likely to contain the LEDPA. These comments should be incorporated in the Final PEIS.

#### *Bay Area to the Central Valley*

Following EPA's review of the Draft PEIS in August 2004, EPA identified potential impacts to aquatic resources of national importance (CWA Section 404(q), 33 U.S.C. 1344(q)), wetlands, water quality, wildlife habitat, and endangered species that would result from the alternative alignments presented for the Diablo Direct and Pacheco alignments within the Bay Area to Merced region. The proposals described in the Draft PEIS for a high speed train route following the Diablo Direct alignments present federal permitting challenges because they would fragment the Diablo Range, bisect aquatic resources of national importance (including Orestimba Creek), and impact State parks, wilderness, and private, state, and federal conservation and mitigation lands. The Draft PEIS identified that a proposed route through the Pacheco Pass may result in significant impacts to waters of the United States, resulting in similar permitting difficulties.

Because of the potentially adverse impacts from the Diablo Direct and Pacheco alignments, we commend FRA and CHSRA for deferring a decision on an alignment connecting the Bay Area to Merced until a supplemental analysis can be completed to demonstrate to the public and the decision-makers that all variations of alternatives connecting the Bay Area to the Central Valley have been fully evaluated consistent with the CWA Section 404(b)(1) Guidelines.

#### *Sacramento to Stockton*

FRA and CHSRA have recommended that both the Union Pacific Railroad (UPRR) and Central California Traction (CCT) alignments be carried forward in the Tier 2 project-level NEPA documents. We understand that the UPRR alignment is preferred by FRA and CHSRA because it is an active freight corridor, is slightly shorter with shorter travel times (1 minute), and has lower construction costs (estimated \$150 million) and that the CCT alignment is an abandoned freight corridor that is identified for a community-supported rails-to-trails project. However, the UPRR alignment would have potentially greater impacts to federally regulated waters than the CCT alignment, and the UPRR alignment is not clearly the alternative most likely to contain the LEDPA. In addition, the UPRR alignment crosses important aquatic conservation lands including Valensin Ranch and Snake Marsh. We agree with the decision to carry both alignments forward for study at the project-level to ensure compliance with the CWA and successful identification of the LEDPA.

#### *Fresno to Bakersfield*

EPA supports the decision by CHSRA and FRA to both (1) identify the Burlington Northern Santa Fe (BNSF) alignment as the preferred option for high speed train service connecting Fresno to Bakersfield, and (2) fully evaluate an additional alignment, such as the UPRR alignment, in project-level environmental review should the proposed additional planning study identify a feasible and practicable alignment that is likely to be less damaging to water and biological resources.

The BNSF and UPRR alignment have similar potential impacts to aquatic resources such as wetlands and streams, while the BNSF alignment has greater impacts to wildlife habitat. We are aware that local biologists are concerned about the potential impact that the BNSF alignment may have on movement corridors for threatened and endangered species and the extent of conservation lands linking the last remaining stands of native habitat, including alkali grasslands and alkali sink scrub. We are confident that the decision to analyze the BNSF alignment, as well

as any alternative that is demonstrated to be less damaging to biological and water resources through the additional proposed study, will result in a high speed train alignment most likely to contain the LEDPA.


*Carroll Canyon and Miramar Road*

As noted following in our comment letter on the Programmatic DEIS, both the Carroll Canyon and Miramar Road alignments for connecting Mira Mesa to San Diego may affect downstream lagoons. The Carroll Canyon alignment will also affect the ability of this region to absorb seasonal and annual flood waters, will increase erosion and sedimentation, and may negatively impact the water quality of the downstream Los Penasquitos Lagoon. Because the Carroll Canyon alignment would affect more vernal pools and more non-wetlands waters than the Miramar Road route, and because this area has been designated as a multiple habitat planning area (MHPA) through the San Diego Multiple Species Conservation Plan, EPA supports FRA and CHSRA's decision to analyze both the Miramar Road and the Carroll Canyon alignments at the project-level.

Thank you for this opportunity to comment on the high speed train alternatives most likely to contain the LEDPA. We have provided the above comments, along with continuous interagency communication and coordination, to aide in the development of future project-level analyses for a high speed train system for California. We look forward to reviewing and commenting on future Tier 2, project-level analyses for this important State-wide project. In addition, we are available to provide guidance and input related to establishing a framework for mitigation and future studies regarding the Bay Area to Central Valley and Fresno to Bakersfield alignments.

EPA will provide comments on the Final PEIS, pursuant to our NEPA/Clean Air Act Section 309 authority, once it is available for public review. This concludes the interagency concurrence process for the Tier I programmatic environmental review process, as established by the MOU. If you have any questions, please feel free to contact me at 415-972-3843, or Nova Blazej, Transportation Team Leader. Nova can be reached at 415-972-3846 or [blazej.nova@epa.gov](mailto:blazej.nova@epa.gov).

Sincerely,



Enrique Manzanilla, Director  
Communities and Ecosystems Division

cc: Mehdi Morshed, California High Speed Rail Authority  
David Castanon, Los Angeles Army Corps of Engineers  
Wayne White, U.S. Fish and Wildlife Service  
Crawford Tuttle, California Resources Agency  
James Branham, California Environmental Protection Agency

Enclosure: EPA Concurrence on High Speed Train Alignment and Station Alternatives Most Likely to Contain the LEDPA



**EPA Concurrence on High Speed Train Alignment and Station Alternatives that are Most Likely to Contain the Least Environmentally Damaging Practicable Alternative**

EPA concurs with the following High Speed Train alignment and station alternatives as “most likely to contain the least environmentally damaging practicable alternative “ to be carried forward for analysis in future Tier 2 project level analyses:

**Bay Area to Merced:**

- **Bay Area to Central Valley:**

Corridor bounded by, an including, the Pacheco Pass (SR-152) to the south, the Altamont Pass (I-580) to the north, the BNSF Corridor to the east, and the Caltrain Corridor to the west, excluding Henry Coe State Park and station options at Los Banos.

- **San Francisco Peninsula:**

Caltrain Corridor (Shared Use Four-Track)

Potential Station Locations: downtown San Francisco (Transbay Terminal), San Francisco Airport (Millbrae), and Redwood City or Palo Alto

- **East Bay Alignment:**

Hayward Line to I-880 (Hayward Alignment/I-880)

Potential Station Locations: West Oakland or 12<sup>th</sup> Street/City Center, Union City, and San Jose

**Sacramento to Bakersfield:**

- **Sacramento to Stockton:**

Union Pacific Railroad (UPRR) and Central California Traction (CCT)

Potential Station Locations: downtown Sacramento, downtown Stockton

- **Stockton to Merced:**

Burlington Northern Santa Fe (BNSF) analyzed with and without an Express Loop

Potential Station Locations: Modesto (Amtrak – Briggsmore) and Merced (downtown or Castle Air Force Base).

- **Merced to Fresno:**

BNSF

Potential Station Locations: Fresno Downtown

- **Fresno to Bakersfield:**

BNSF (and any other practicable alternatives identified as being less damaging to water and/or biological resources following additional study to serve a potential Visalia Station)

Potential Station Locations: downtown Bakersfield (Truxton)

**Bakersfield to Los Angeles:**

- **Bakersfield to Sylmar:**

SR-58/Soledad Canyon Corridor (Antelope Valley)

Potential Station Locations: Palmdale Airport Transportation Center

- **Sylmar to Los Angeles:**

Metrolink/UPRR

Potential Station Locations: downtown Burbank (Burbank Metrolink Media Station) and Los Angeles Union Station

**Los Angeles to San Diego via Inland Empire:**

- **Los Angeles of March Air Reserve Base:**

UPRR Riverside/UPRR Colton Line

Potential Station Options: East San Gabriel Valley (City of Industry), Ontario Airport, and Riverside (UC Riverside)

- **March Air Reserve Base to Mira Mesa:**

I-215/I-15

Potential Station Locations: Temecula Valley (Murrieta) and Escondido

- **Mira Mesa to San Diego:**

Carroll Canyon or Miramar Road

Potential Station Locations: University City and Downtown San Diego (Santa Fe Depot)

**Los Angeles to Orange County:**

- **Los Angeles to Irvine:**

LOSSAN Corridor

Potential Station Locations: Norwalk, Anaheim Transportation Center, and Irvine Transportation Center.



DEPARTMENT OF THE ARMY  
LOS ANGELES DISTRICT, CORPS OF ENGINEERS  
P.O. BOX 532711  
LOS ANGELES, CALIFORNIA 90053-2325

July 22, 2005

REPLY TO

ATTENTION OF:

Office of the Chief  
Regulatory Branch

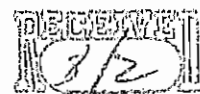
Mr. Mark E. Yachmetz  
Associate Administrator for Railroad Development  
U.S. Department of Transportation  
Federal Railroad Administration  
1120 Vermont Avenue, N.W.  
Washington, D.C. 20590

Dear Mr. Yachmetz:

I am responding to your request (dated July 11, 2005 and addressed to Mr. David J. Castanon) for concurrence on the alternative 'most likely to yield' the least environmentally damaging practicable alternative ("LEDPA") for the statewide **California High Speed Train Project** ("Project"). If approved and implemented, the Project would entail an approximate 700-mile-long high-speed train connecting San Diego, Los Angeles, the Central Valley, Sacramento and the Bay Area regions. The system would be grade-separated and capable of reaching speeds in excess of 200 miles per hour.

The Project's Draft Program Environmental Impact Report/Environmental Impact Statement ("EIR/EIS") analyzes two primary 'system' alternatives, which include a proposed high-speed train alternative and a modal alternative, plus the required No Project/No Action alternative. In addition to the system alternatives, the Federal Railroad Administration ("FRA") and the project proponent, the California High Speed Rail Authority ("CHSRA"), evaluated a range of potential high-speed train corridors, alignments and associated station locations within the five regional areas. Under our Section 404 of the Clean Water Act purview, the Corps provided feedback on the evaluation of these alternatives and offered technical input pertaining to aquatic resources for the development of the Program EIR/EIS.

In accordance with the Project's 2003 Cooperating Agencies Memorandum of Understanding ("MOU") between the FRA, the U.S. Army Corps of Engineers ("Corps"), Federal Highway Administration, Federal Transit Administration, and U.S. Environmental Protection Agency, we offer our concurrence on the preferred high-speed train corridors/general alignments and general station locations identified in the attachments to your April 26, 2005 and July 11, 2005 correspondences. We have based our concurrence on the information and analyses provided in the *Staff Recommendations on Identifying Preferred Alignment and Station*



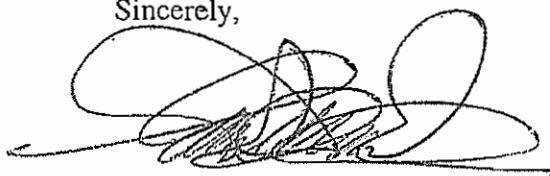
*Locations* report (dated January, 2005), the screen check Draft Final Program EIR/EIS (dated June 24, 2005; and as amended July 19, 2005), and the supplemental information transmitted to our office July 11, 2005.

At this programmatic transportation planning stage, our concurrence on the alternative 'most likely to yield' the LEDPA represents a decision commensurate with the level and breadth of existing environmental data made available to the Corps. Moreover, such concurrence does not obviate the need for the FRA to fully comply with all requirements of the 404(b)(1) Guidelines during the preparation of any subsequent project-level EIS, at which time it is expected the CHSRA and/or FRA would seek Section 404 of the CWA and Section 10 of the Rivers and Harbors Act permits, as appropriate.

I am forwarding copies of this letter to Mr. Mehdi Morshed and Mr. Dan Leavitt, California High Speed Rail Authority, 925 L Street, Suite 1425, Sacramento, California 95814; Mr. Enrique Manzanilla and Mr. Tim Vendlinski, U.S. Environmental Protection Agency, Region IX, 75 Hawthorne Street, San Francisco, California 94105-3901; and Mr. Mark Littlefield, U.S. Fish and Wildlife Service, Ecological Services, 2800 Cottage Way, Room W-2605, Sacramento, California 95825.

The Corps recognizes the importance of this statewide project and in working collaboratively with the FRA on the Final Program EIR/EIS. If you have any questions relating to Section 404 of the Clean Water Act or our regulatory program in general, please feel free to contact Ms. Susan A. Meyer at (213) 452-3412 of my staff. Please refer to this letter and 200100857-SAM in your reply.

Sincerely,

A handwritten signature in black ink, appearing to read 'Alex C. Dornstauder', with a horizontal line extending to the left.

Alex C. Dornstauder  
Colonel, US Army  
District Engineer





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION IX  
75 Hawthorne Street  
San Francisco, CA 94105-3901

April 30, 2008

David Valenstein, Environmental Program Manager  
Federal Railroad Administration  
1120 Vermont Avenue, NW, MS 20  
Washington, D.C. 20590

Subject: EPA Concurrence on the Corridor Most Likely to Contain the Least  
Environmentally Damaging Practicable Alternative for the Bay Area to Central  
Valley Draft Programmatic Environmental Impact Statement

Dear Mr. Valenstein:

The U.S. Environmental Protection Agency (EPA) is writing in response to your request of March 6, 2008 for concurrence on the corridor most likely to contain the least environmentally damaging preferred alternative (LEDPA) for the proposed **Bay Area to Central Valley California High Speed Train System**. We appreciate receiving follow-up materials provided to us via meeting on March 18, 2008. As outlined in the Cooperating Agency Memorandum of Understanding (MOU), EPA's concurrence on the corridor most likely to contain the LEDPA is intended to integrate the requirements of the National Environmental Policy Act (NEPA) and Section 404 of the Clean Water Act early in the environmental review process. EPA appreciates the coordination with your agency on this project and looks forward to continued participation in this, and future project-level, environmental reviews.

**PURPOSE AND NEED**

On January 27, 2007, EPA concurred with the following purpose and need statement for the Bay Area to Central Valley High Speed Train project:

*"The purpose of the Bay Area High Speed Train is to provide a reliable high-speed electrified train system that links the major Bay Area cities to the Central Valley, Sacramento, and Southern California, and that delivers predictable and consistent travel times. Further objectives are to provide interfaces between the HST system and major commercial airports, mass transit and the highway network, and to relieve capacity constraints of the existing transportation system in a manner sensitive to and protective of the Bay Area to Central Valley region's and California's unique natural resources".*

**RANGE OF ALTERNATIVES**

Through the January 27, 2007 letter, EPA also concurred with the range of System Alternatives to be advanced to the Tier 1 Draft EIS. These alternatives include No Build/No

Action, Modal, and High Speed Train. EPA also concurred with all of the High Speed Train alignment and station alternatives to be advanced to the Tier 1 Draft EIS at that time.

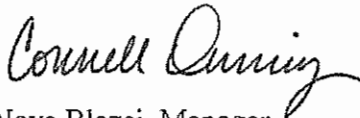

**MOST LIKELY CORRIDOR TO YIELD THE LEDPA**

Through this letter, and based on our review of the information provide to EPA as of this date, EPA concurs that the corridor most likely to yield the LEDPA is the "Pacheco Pass, San Francisco and San Jose Termini".

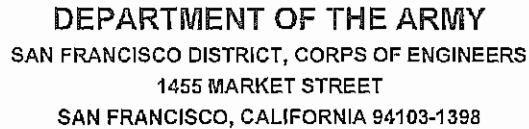
Thank you for this opportunity to participate in the Bay Area to Central Valley High Speed Train planning process. As a cooperating agency, we continue to be available to review administrative drafts and technical reports related to air quality, aquatic resources, and cumulative impacts analysis.

We look forward to reviewing and commenting on the proposed conceptual mitigation plan and completed Tier 1 Final EIS, pursuant to our NEPA/Clean Air Act Section 309 authority. If you have any questions, please feel free to contact me at 415-972-3846, or Connell Dunning, the lead reviewer for this project. Connell can be reached at 415-947-4161 or [dunning.connell@epa.gov](mailto:dunning.connell@epa.gov).

Sincerely,

  
 Nova Blazej, Manager  
Environmental Review Office

cc: Dan Leavitt, California High Speed Rail Authority  
Bob Smith, Army Corps of Engineers




MAY 08 2008

Dear Mr. Valenstein:

Should you have any questions regarding this matter, please call Bob Smith of our Regulatory Branch at 415-503-6792. Please address all correspondence to the Regulatory Branch and refer to the File Number at the head of this letter.

Sincerely,



Jane M. Hicks

Jane M. Hicks  
Chief, Regulatory Division

Copy Furnished:

US, EPA, San Francisco, CA: 415 774 2000. <http://www.epa.gov/epaoswer/hltheff/ohrt/>

Appendix E – Section 408 Submittal package requirements

**Section 408 Submittal Package Requirements for Checkpoint C**

Nossaman LLP

June 19, 2012, as revised July 3, 2012 to include CVFPB regulatory background and CVFPB application requirements as set forth in CVFPB regulations.

**I. Legal Setting.**

**A. Legal Finding Required to Issue 408 Permission.**

The ultimate goal of a Section 408 Submittal Package to the U.S. Army Corps of Engineers (“Army Corps”) is to provide enough information to enable the Army Corps make the following finding or findings for the temporary or permanent occupation or use of any public works built or controlled by the United States to prevent floods or improve the navigable waters of the U.S.:

Temporary: The occupation or use will not be injurious to the public interest.

Permanent: (1) the occupation or use will not be injurious to the public interest, and  
(2) will not impair the usefulness of such public works.

33 U.S.C. § 408 (Section 14 of the Rivers and Harbors Appropriation Act of 1899); *see also* 33 C.F.R. § 209.170(b) (Secretary of the Army may, on the recommendation of the Chief of Engineers, grant permission for the temporary occupation or use of any . . . public works when in his judgment such occupation or use will not be injurious to the public interest); 33 C.F.R. § 320.4(g)(5) (“Proposed activities in the area of a federal project which exists or is under construction will be evaluated to insure that they are compatible with the purposes of the project.”).<sup>1</sup>

Thus, if Army Corps finds that a use or occupation of an Army Corps structure such as a dam or flood control project is not contrary to the public interest, and will not impair the usefulness of the Army Corps structure, the Army Corps may issue “permission” (in effect, a permit) to occupy or use an Army Corps flood control structure or other improvement to navigable waters.

As explained below, even if the Army Corps can make the required findings for the project as proposed, the District Engineer nevertheless has discretion to require “mitigation,” including “minor project modifications” to minimize adverse project impacts, provided the “minor modifications” are feasible and result in a project that meets the applicant’s purpose and need. 33 C.F.R. § 320.4(r)(i).

**B. Public Interest Review.**

The public interest review is governed by the provisions of 33 C.F.R. § 320.4. Because it applies to all Army Corps-issued permits, the same public interest review applies to the Clean Water Act section 404, and Rivers and Harbors Act section 10 permitting processes.

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<sup>1</sup> If construction or performance of any other work takes place in a navigable waterway, a permit is required under 33 C.F.R. § 209.180(a) upon demonstration that the closure is necessary, and that the time and duration of the closure will enable operations to be completed with the least interference with navigation, and the applicant will notify navigation interests by advertisement in the press or otherwise as the District Engineer may approve.



## 1. Cost-Benefit Analysis.

Public interest review is based on the benefits to the public of the proposed project weighed against its “reasonably foreseeable detriments,” including cumulative impacts. The factors to be considered overlap to a large extent with those considered in the NEPA/CEQA analysis:

conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values [e.g., habitat for fish and wildlife and water quality], land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership and, in general, the needs and welfare of the people.

33 C.F.R. § 320.4(a)(1); *see also* Section 122 of the River and Harbor Act of 1970, Pub. L. 91-611 (Dec. 31, 1970), 84 Stat. 1818 (requiring the Chief of Engineers to promulgate guidelines “to assure that possible adverse economic, social and environmental effects relating to any proposed project have been fully considered in developing such project . . .”).

Indeed, because of its overlap with a host of other natural and cultural resource laws, the public interest review regulation recognizes that “a permit will generally be issued following receipt of a favorable state determination,” and provided that the applicable statutes have been considered and followed, including, e.g.:

The National Environmental Policy Act [NEPA]; the Fish and Wildlife Coordination Act [FWCA]; the Historical and Archeological Preservation Act; the National Historic Preservation Act; the Endangered Species Act [ESA]; the Coastal Zone Management Act [CZMA]; the Marine Protection, Research, and Sanctuaries Act of 1972, as amended; the Clean Water Act [CWA]; the Archeological Resources Act, and the American Indian Religious Freedom Act.

33 C.F.R. § 320.4(j)(4). Indeed, “for Federal and Federally-authorized activities; another federal agency’s determination to proceed is entitled to substantial consideration in the Corps’ public interest review.” *Id.* Thus, once the Federal Railroad Administration issues a Record of Decision and project approval for a section of the HST, Army Corps should weigh that factor heavily in favor of granting a Section 408 Permit.

Thus, in obtaining CHSRA and FRA approval, and in complying with CEQA, NEPA, CWA, ESA, and other statutory requirements, Army Corps need not conduct a separate “public interest review.” Documenting state and federal project approvals and compliance with other laws enacted for the protection of natural and cultural resources should provide Army Corps with the record it needs to make its public interest finding under Section 408.

## 2. Alternatives Analysis.

It is important to note that in conducting public interest review, the Army Corps will also consider “the practicability of using reasonable alternative locations and methods to accomplish the objective of the proposed structure or work.” 33 C.F.R. § 320.4(a)(2)(ii). In addition, to comply with the requirements of Executive Order 11988 of May 24 1977 – Floodplain management,<sup>2</sup> “the

<sup>2</sup> Reproduced at 42 Fed. Reg. 26,951 (May 25, 1977).

district engineer should avoid authorizing floodplain developments whenever practicable alternatives exist outside the floodplain.” 33 C.F.R. § 320.4(l)(3).

In general, the structure or work permitted under public interest review need not be the least environmentally damaging practicable alternative (LEDPA). However, if the proposed structure or work will impact wetlands considered “important to the public interest,” or will result in a cumulative impact to a “complete and integrated wetland area,” the Army Corps “shall apply the section 404(b)(1) guidelines . . . .” 33 C.F.R. § 320.4(b)(4). And the 404(b)(1) guidelines require identification of the LEDPA. However, the LEDPA is selected pursuant to the 404(b)(1) guidelines for the specific purpose of issuing a 404 Permit.

Thus, a strong argument can be made that this “factor” in public interest review does not require Army Corps to identify a LEDPA for purposes of issuing a Section 408 Permit, even if the activity that will “use or occupy” an Army Corps flood control facility will also impact a wetland important to the public interest. Nevertheless, in recent draft guidance, Army Corps has stated that “reasonable and practicable alternatives to the proposed project that avoids impacts to the public works project *must be considered and presented to the District.*”<sup>3</sup>

There is no basis in law for such a categorical requirement to submit alternatives to the proposed crossing of an Army Corps facility in 33 U.S.C. § 408 or 33 C.F.R. § 320.4. However, the District Engineer may determine that to fulfill the requirement that he or she “*should* avoid authorizing floodplain development whenever practicable alternatives exist outside the floodplain[,]” the applicant *must* consider and present reasonable and practicable alternatives that avoid impacts to the Army Corps structure altogether, if any. 33 C.F.R. § 320.4(l)(3).

Thus, when submitting a request for 408 Permit or coordinating submission of a 408 Permit package, it is important to document, or be prepared to document, the impracticability of alternatives that would avoid impacting (even if only crossing) any Army Corps flood control project altogether. Such documentation may already be included in a Checkpoint C Summary Report in support of the LEDPA, or in the alternatives analysis conducted in the project-level EIS for the HST section.

### **3. Mitigation.**

The District Engineer possesses considerable discretion to condition issuance of any Army Corps permit, including a Section 408 Permit, on enforceable “mitigation.” The public interest review regulation specifies three general categories of mitigation measures: (1) project modifications to minimize adverse project impacts; (2) mitigation measures required to satisfy other legal requirements, including mitigation imposed in connection with a Section 404 Permit; and (3) mitigation specifically required “to ensure that the project is not contrary to the public interest . . . .” 33 C.F.R. § 320.4(r)(1)(i)-(iii).

Significantly, the District Engineer may require “minor project modifications” including “reductions in scope and size; changes in construction methods, materials, or timing; and operation and maintenance practices or other similar modifications that reflect a sensitivity to environmental quality within the context of the work proposed.” 33 C.F.R. § 320.4(r)(i). The District Engineer may impose such minor modifications *even though the mitigation is not required to satisfy any*

<sup>3</sup> ACOE, 13500 SWD QMS Approval of Alterations to Existing U.S. Army Corps of Engineers Public Works Projects 7, § 7.2 (Draft Ver. Jan. 20, 2011) (2011 Draft Guidance) (emphasis added). Although the guidance is in “draft” form, district staff may already follow it as a matter of policy.

*other legal requirement (e.g., Section 404 mitigation), and even though it is not required to ensure that the project is not contrary to the public interest. Id.*

This discretion is not unlimited. “Minor project modifications are those that are considered feasible (cost, constructability, etc.) to the applicant and that, if adopted, will result in a project that generally meets the applicant’s purpose and need.” *Id.* “For example, erosion control features could be required on a fill project to reduce sedimentation impacts or a pier could be reoriented to minimize navigational problems . . . .” *Id.* In addition, “all mitigation will be directly related to the impacts of the proposal, appropriate to the scope and degree of those impacts, and reasonably enforceable.” 33 C.F.R. § 320.4(r)(2). In short, the District Engineer may not impose “minor project modifications” as a condition of a Section 408 Permit unless the modification bears a nexus with the impact, is proportional to the scope and degree of the impact, is “feasible . . . to the project applicant,” and is consistent with the purpose and need of the project.

Because the impacts to waters of the United States, including sensitive wetlands, will be subject to enforceable mitigation requirements pursuant to the Section 404 permit, and impacts to riparian habitat will be subject to mitigation pursuant to the Department of Fish & Game Streambed Alteration Agreement, a strong argument can be made that the District Engineer could not impose any additional mitigation for loss of wetlands or habitat in connection with the 408 Permit.

In addition, due to the well-documented design constraints that apply to an HST alignment, both laterally and vertically, and because the approved alignment will be the LEDPA, it is unlikely that Army Corps would exercise its discretion pursuant to 33 C.F.R. § 320.4(r)(ii) to require an additional showing that each particular crossing design constitutes a “mini-LEDPA.” Instead, it may require “minor project alterations” such as altering the orientation of piers, or restricting the time when work may be performed, provided that such alterations are feasible to CHSRA and FRA, and are proportional to the scope and degree of the impact to be avoided by the alteration.

### **C. Finding of No Impairment of Usefulness.**

The Army Corps has promulgated regulations at 33 C.F.R. parts 208-209, 320, and issued a series of technical and legal guidance memoranda in the last several decades to guide implementation Section 408 in terms of documenting a determination that the use or occupation will not impair the usefulness of the Army Corps structure.

It is important to note that while there is no specific level of technical documentation required by statute or regulation to obtain Section 408 Permission, the Army Corps has substantial discretion to require whatever technical documentation it believes is “sufficient” to assure itself that any encroachment into or over an Army Corps flood control facility or other improvement will not “adversely affect the functioning of the protective facilities” (33 C.F.R. § 208.10(a)(5)), and, ultimately, “will not impair the usefulness of such works” (33 U.S.C. § 408).

Army Corps has issued technical guidance in a series of , Engineer Regulations (ERs), which are mandatory policy requirements;<sup>4</sup> Engineer Manuals (EMs), which are policy standards for uniform

<sup>4</sup> Although called “regulations,” the ERs have not been promulgated in compliance with the notice-and-comment rulemaking procedures in the federal Administrative Procedure Act. Nevertheless, when dealing with Army Corps staff and district leadership, it is important to keep in mind that staff and district-level personnel have no discretion to disregard the mandatory requirements of such “guidance.” In some instances, the guidance documents provide procedures for districts to request waivers of

engineering practice related to civil works projects, and which include some mandatory requirements relating to project safety and function; Engineer Technical Letters (ETLs), which are similar to EMs, but intended for temporary use; Engineer Circulars (ECs), which are used for temporary publication of draft content of ERs or EMs; as well as Engineer Pamphlets (EPs) and policy and procedural guidance in a series of “Memoranda for Major Subordinate Commands” that may discuss specific mandatory standards in ERs and EMs. *See generally*, ER 1110-2-1150 at 23 (Aug. 31, 1999).<sup>5</sup>

The general requirements of such guidance, and the Army Corps’ evolving position on how those requirements may be fulfilled are discussed in Section II, below. But the precise technical requirements for engineering and risk analysis are beyond the scope of a legal memorandum.

**D. “Minor” vs. “Major” 408 Permits.**

**1. Minor, Low-Impact Alterations/Modifications that Will Not Significantly Increase Risk to Public Safety.**

For any occupation or use of a federally operated and maintained Army Corps flood control structure that falls within its “maintenance and operation” responsibilities, “[n]o encroachment or trespass which will adversely affect the efficient operation or maintenance of the project works shall be permitted upon the rights-of-way for the protective facilities.” 33 C.F.R. § 208.10(a)(4). Thus, to issue permission under this authority, the Army Corps must be satisfied that any “improvement, excavation, construction, or alteration” will not “adversely affect the functioning of the protective facilities.” *Id.* at § 208.10(a)(5).

Permission granted pursuant to 33 C.F.R. § 208.10 is sometimes referred to as a so-called “Minor 408 Permit.” But is also sometimes referred to as a “208/408 Permit,” or even a “208 Permit” in light of the C.F.R. section number. In 2006, Army Corps issued guidance authorizing District Engineers to approve “minor, low-impact” modifications to any Army Corps structure, whether federally or locally operated and maintained.<sup>6</sup> However, in a memorandum dated June 18, 2010, authority to approve Section 408 permit applications for “minor, low-impact” modifications to flood protection works operated and maintained by *non-federal* sponsors corresponding to minor, low-impact modifications previously being considered under 33 C.F.R. § 208.10(a)(5) was delegated to the District Commanders under 33 U.S.C. § 408.<sup>7</sup>

Thus, since 2010, so-called Section 208 permission is only granted for minor, low-impact modifications to *federally* operated and maintained flood control structures. All other Minor 408 Permits are granted by the District Commanders under 33 U.S.C. § 408. Nevertheless, the Army Corps applies the same criteria to determine whether a project qualifies as a “minor, low-impact”

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certain requirements in ERs, EMs, and other such documents. Only Army Corps personnel can relate the extent to which such waivers are sought or granted.

<sup>5</sup> ERs, EMs, ECs, and other guidance documents can be obtained at the Official Publications of the Headquarters, United States Army Corps of Engineers online at <http://publications.usace.army.mil/publications/index.html>.

<sup>6</sup> See CECW-PB, Memorandum for Major Subordinate Commands, Policy and Procedural Guidance for the Approval of Modification and Alteration of Corps of Engineer Projects (Oct. 23, 2006) (“ACOE 2006 Memo”).

<sup>7</sup> See CECW-PB, Memorandum for Major Subordinate Commands and District Commanders, Delegation of Authority to District Commanders to Approve Pursuant to 33 U.S.C. 408 Those Minor, Low-Impact Modifications to Flood Protection Works Operated and Maintained by Non-Federal Sponsors Previously Being Considered under 33 CFR 208.10(a)(5) (June 18, 2010).

modification to an Army Corps flood control structure, regardless of whether it is for federally operated and maintained structures under Section 208, or it is for locally operated and maintained structures under Section 408.

The District Engineer is authorized to approve “relatively minor, low impact modifications, such as pipes or pipelines proposed to pass over or through a Federal work, or a road or similar type of infrastructure improvement proposed to pass over a Federal levee.”<sup>8</sup> More recently, Army Corps added to the following list of alterations/modifications that can be approved by the District Engineer: “placement of structures such as pump houses, stairs, pipes, bike trails, sidewalks, fences, driveways, power poles, and instrumentation[,] provided these alterations/modifications do not adversely affect the functioning of the project and flood fighting activities.”<sup>9</sup> In more general terms, if the proposed changes “do not change the authorized structural geometry or hydraulic capacity” of the flood control system, they may be approved by way of a Minor 408 Permit.<sup>10</sup> Recently, in draft guidance, Army Corps has added that if an alteration poses a “significant increase in risk to public safety,” it does not qualify for a Minor 408 Permit.<sup>11</sup>

**2. Significant Changes to Army Corps Flood Control Project’s Scope, Purpose, or Functioning, Including Degradations, Raisings, and Realignment, or Other Alterations that May Significantly Increase the Risk to the Public.**

In contrast, a Major 408 is required where the proposed alteration/modification “would involve significant changes to the authorized project’s scope, project purpose, or functioning,”<sup>12</sup> such as “degradations, raisings, and realignments and other alteration/modifications” not called out as examples of minor, low-impact alterations in guidance.<sup>13</sup> As noted above, in 2011 Draft Guidance, Army Corps has also indicated that any alternation that poses a “significant increase in risk to public safety” would require a Major 408 Permit.<sup>14</sup>

The 2008 Guidance also provides a procedure to determine whether a Major or Minor 408 Permit is required in instances where it is not clear whether it falls within one or the other: e.g., “non-Federal levee tie-ins, ramps, riverside landscaping, retaining walls, fill against a levee (such as railroad trestles and overbuild), bridges, relief wells, seepage berms, and stability berms.”<sup>15</sup> In those instances, guidance specifies that “there must be an engineering analysis conducted with consideration of the full range of loading conditions to determine the impact of the alteration/modification on systems performance (flood elevations and structural integrity).”<sup>16</sup>

One of the chief advantages of qualifying for and obtaining a Minor 408 Permit is that the District Engineer is authorized to issue it for federally operated and maintained flood control structures (33 C.F.R. § 208.10(a)(5)), and the District Commander is authorized to issue a Minor 408

<sup>8</sup> ACOE 2006 Memo at 2.

<sup>9</sup> CECW-PB, Memorandum, Clarification Guidance on the Policy and Procedural Guidance for the Approval of Modifications and Alterations of Corps of Engineers Projects 2, § 3.a.(1) (Nov. 17, 2008) (ACOE 2008 Memo).

<sup>10</sup> *Id.*

<sup>11</sup> 2011 Draft Guidance at 6, § 7.1 (italics removed).

<sup>12</sup> ACOE 2006 Memo at 2.

<sup>13</sup> ACOE 2008 Memo at 2, § 3.a.(2).

<sup>14</sup> 2011 Draft Guidance at 6, § 7.1 (italics removed).

<sup>15</sup> ACOE 2008 Memo at 2, § 3.a.(2).

<sup>16</sup> *Id.*



Permission for any non-federally operated and maintained flood control structure. CECW-PB  
June 18, 2010.

However, if a Major 408 Permit is required, the District Engineer will prepare a recommendation to be considered and acted upon by the Chief of Engineers at USACE headquarters (“HQUSACE”). By Army Corps’ own estimate, this process could take 12-18 months.<sup>17</sup> In contrast, for a relatively uncomplicated Minor 408 Permit, the District Engineer’s review and approval of a complete Minor 408 Permit application could take as little as 30 days.<sup>18</sup>

According to Army Corps guidance, the recommendation and formal HQUSACE review process can take substantially longer, and may require CHSRA to submit substantially more information in advance of Checkpoint C, including a Risk Analysis in accordance with Army Corps technical guidance ER 1110-2-101 (including existing/base hydrologic and hydraulic compared to modified condition); EM 1110-2-1619 (geotechnical and structural performance); modeling to demonstrate geotechnical and structural integrity under full range of loading conditions; Safety Assurance Review (SAR) in accordance with EC 1165-2-209, a Real Estate Analysis in accordance with ER 405-1-12; a discussion of residual risk setting forth the changes to existing levels of risk to life and property as a result of the modification; the administrative record for key decisions, including environmental reports, permits, and judicial decisions;<sup>19</sup> and evidence of compliance with all “environmental protection” statutes and regulations, including NEPA, ESA, FWCA, CWA, CAA, CZMA, and other statutes.<sup>20</sup>

Although it is not stated in any regulations or final guidance, by negative implication, the same level of documentation is not required for the District Engineer to determine whether the proposed “modification” to an Army Corps flood control facility would not result in any adverse effect on its protective capabilities. According to the ACOE 2008 Memo, “[n]on-Federal proposals to degrade, raise, or realign existing Corps projects under 33 U.S.C. 408 should be evaluated as new construction of Federal projects and the potential impacts of these changes, including system impacts, must be evaluated in accordance with Corps regulations and policy.” ACOE 2008 Memo at 3, § 3.b.(1).

The level of detail that Army Corps ultimately requires to approve a Minor 408 Permit is under discussion. However, some possibilities are set forth in the following section based on draft guidance that Army Corps issued in late 2011, and based on discussions with the Authority to date.

<sup>17</sup> Army Corps is authorized to accept funds from non-federal public entities to expedite review of Section 408 Permit applications. CECW-PB, Memorandum, Implementation Guidance for Utilizing Section 214 of the Water Resource Development Act of 2000, as amended to Accept Funding from Non-Federal Public Entities to Expedite the Evaluation of Permits Pursuant to 33 U.S.C. 408 ([date]). However, even with expedited review, it appears that the HQACOE approval process could take at least several months to over a year. According to the 2011 Draft Guidance, the estimated time it takes to obtain a Major 408 Permit is 12-18 months. 2011 Draft Guidance at 11, § 7.6.

<sup>18</sup> *Id.*

<sup>19</sup> The requirement that the entire administrative record for an environmental review document such as an EIS be submitted appears to be an error. Compiling and submitting the administrative record for a large project could cost hundreds of thousands of dollars, take months or years to prepare, the resulting record would be voluminous, and it would serve none of the purposes of public interest or technical review. A more reasonable interpretation would be to include the Record of Decision (ROD) for an EIS and state and federal agency project approvals since Army Corps is required to afford them great weight in conducting its public interest review. 33 C.F.R. § 320.4(j)(4).

<sup>20</sup> See ACOE 2008 Memo, Section 408 Submittal Package Guide.

## II. Section 408 as Applied to the California HST.

Army Corps guidance requires different levels of documentation from the applicant depending on whether Army Corps considers it “major” or “minor.” But, as explained below, the MOU and the subsequent “Data Needs Memo” that Army Corps and EPA issued (but to which CHSRA never agreed), were drafted without taking into account unique engineering constraints in designing an HST or the design-build contracting approach being used for the HST. In addition, based on a comparison of the MOU and Data Needs Memo to Army Corps guidance, it appears that the submittals required in the MOU and Data Needs Memo are those required for a Major 408 Permit.

This has lead to Army Corps’ initial expectation that for each location where an HST alignment alternative would cross an Army Corps flood control structure, the CHSRA would produce 30% engineering plans at Checkpoint B, and *60% engineering plans* in advance of the initial Checkpoint C meeting.

Figure 1: Overview of the California HST Program MOU Process indicates that at Checkpoint B, the Authority will provide *30% design* of the HST section at any federally authorized flood protection project. MOU at 4 (emphasis added).

However, at page B-4, the MOU provides that the District will make the major/minor determination “[w]hen the Authority has provided *sufficient* engineering and hydraulic analysis.” MOU at B-4 (emphasis added). Although Figure 1 is cited, the more reasonable interpretation of the MOU would allow Army Corps to make the major/minor determination based on whatever level of engineering and hydraulic analysis will provide it with the information it needs to determine whether the proposed alteration/modification would adversely affect the function of the levees (i.e., compromise their structural integrity, raise the floodway elevation more than 0.1 feet during a 100-year flood event, impede access for operation, maintenance, and levee protection during a flood).

### A. Minor 408 Submittal Requirements.

As stated above, neither the MOU nor the Data Needs Memo explains what documentation is required to support a request for a Minor 408 Permit. To date, we are aware of two sources of guidance: the 2011 Draft Guidance from Army Corps, and direct negotiations with Army Corps district-level staff.

#### 1. Theoretical Submittal Requirements Based on 2011 Draft Guidance.

1. A detailed description of the proposed alteration;
2. The purpose and need of the alteration;
3. A map indicating the location of the proposed alteration;
4. Geotechnical analysis of stability, seepage/under seepage, erosion control, vegetation, material usage/borrow/waste/transport/hauling, and compaction;
5. Structural analysis of bridges and abutments, pier penetrations of levee embankments, diaphragm walls, gates or other operable features, and other structural components of the proposed alteration;

6. Hydrology and hydraulics, including an analysis of impacts to the Army Corps project design flood water surface profile, impacts to valley storage, downstream and upstream impacts, and a hydraulic model (if applicable);
7. Impacts to operation and maintenance procedures;
8. Location of construction staging areas and an emergency action plan for high water events during construction.
9. Demonstration of compliance with NEPA; and
10. A “final” set of plans and specifications.<sup>21</sup>

## **2. Negotiated Minor 408 Permit Submittal Requirements.**

[To be revised and supplemented in light of ongoing negotiations with Army Corps staff in light of unique project characteristics and design constraints. Mark McLoughlin to request example of “Minor 408 Permit” submission from Ryan Larson or other staff member at Army Corps.]

Based on reports of meetings and discussions with Army Corps personnel, it appears that Army Corps is willing to accept the following:

1. Conceptual design of crossing, including cross-sections, placement of piers, conceptual design of piers, all represented relative to the mapped Base Flood Elevation (BFE) (also known as the 100-year flood elevation);<sup>22</sup>
2. HEC-RAS to demonstrate that modification would cause less than a 0.1-foot rise in the floodway during a 100-year flood event;
3. At least 3-foot clearance over BFE (to allow for passage of floating debris);
4. Access to levees for inspection, operation, and maintenance, including ability of federal or local operating agency to protect the levee during a flood;
5. If levee failure is a possibility for the 100-year flood, Army Corps may require conceptual design showing sufficient culverts/wildlife under crossings to accommodate flow behind existing levees;
6. Estimate of scour potential based on conservative assumptions about water depth and composition of streambed soils and substrate (to the extent possible, base assumptions on studies in the most closely analogous part of the watershed or Central Valley).

<sup>21</sup> 2011 Draft Guidance, Attachment B, Minor Project Submittal Requirements.

<sup>22</sup> According to one project engineer, the mapped BFE can vary significantly from surveyed elevations. Thus, where actual survey results are not available, conceptual designs should include all assumptions and appropriate caveats regarding elevation of structure being subject to change if the surveyed BFE differs from the FEMA BFE in a FIRM or other source.

To the extent that Army Corps feels it needs to conduct public interest review for a Minor 408 Permit, documentation of compliance with CEQA, NEPA, ESA, FWCA, CWA, CAA, historical, cultural, and archeological resource protection laws, and other applicable environmental review statutes may suffice to support a finding that the proposed alteration/modification is not contrary to the public interest.

Army Corps staff has indicated that the 408 Permit conditions will take into account the level of design and availability of survey and soil analysis at the time the permit is issued. Thus, as the design-build process moves forward, more detailed and refined designs must be submitted along with whatever technical information (potentially including updated HEC-RAS) is required to demonstrate that the more detailed and/or refined design will not have an adverse impact on the function of or access to Army Corps levees. In particular, any refinements in design cannot result in an increase in BFE of more than 0.1 feet in the floodway.

**B. Major 408 Permit Submittal Requirements.**

**1. MOU and Data Needs Memo Requirements Based on Guidance.**

According to the MOU, if a Major 408 Permit is required, the CHSRA shall provide the safety assurance review plan and all the necessary technical analysis and supporting documentation for the following:

1) Risk Analysis: The Authority shall provide an analysis of the risk and uncertainty through evaluation of potential system impacts limited to the hydrologic and hydraulic parameters. Impacts will be determined by comparing performance parameters as presented in ER 1110-2-101 for the existing or base condition to the condition resulting from the project alteration/modification. The base performance conditions are defined by authorized project features. The USACE has provided technical guidance in EM 1110-2-1619, but has yet to fully develop the guidance needed to analyze risk and uncertainty for the geotechnical and structural performance of a system. Until such guidance is developed, deterministic procedures [e.g., modeling procedures] are appropriate for demonstrating geotechnical and structural integrity under the full range of loading conditions.

2) Safety Assurance Review (SAR): Approval of the Safety Assurance Review (SAR) Plan is required by the USACE Division. When the USACE District is concurrently performing investigations that will entail a safety assurance review at the project location, the SAR for the overarching study will suffice but must be completed prior to initiation of construction. In cases where no USACE investigations are ongoing, an SAR on the proposed alteration/modification must be performed by the Authority in advance of Checkpoint C in accordance with EC 1165-2-209. The USACE District will utilize the SAR results when making a preliminary 408 District recommendation.

3) Policy Compliance: The applicable USACE District shall review and certify the legal/policy/technical and quality management of the decision document for each alteration or modification requiring HQUSACE approval.

A 60 percent or greater engineering design as well as any additional information specified in the (a) October 23, 2006, CECW-PB Memorandum for Major Subordinate Commands, SUBJECT: Policy and Procedural Guidance for the

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Approval of Modification and Alteration of Corps of Engineer Projects and (b) November 17, 2008, CECW-PB Memorandum from the Director of Civil Works titled "Clarification Guidance on the Policy and Procedural Guidance for the Approval of Modifications and Alteration of Corps of Engineers Projects" is required for a USACE District to provide a preliminary recommendation.

MOU, Appendix B at B-4 – B-5; Data Needs Memo at 20-21 (same).

The documentation required in the MOU and Data Needs Memo tracks, in somewhat less detail, the requirements set forth in the Section 408 Submittal Package Guide attached to the 2008 Guidance Memo:

1. Written request for approval of the project modification
  - A detailed description of the proposed modification
  - The purpose/need for the modification
  - An appropriate map or drawing
2. Technical Analysis and Adequacy of Design. All necessary technical analysis should be provided.

The list below is only a guide for typical items that would routinely be expected and is not intended to list every item that could be needed to make this determination.

- Geotechnical Evaluation.
  - o Stability
  - o Under seepage
  - o Erosion Control
  - o Vegetation
  - o Material usage/borrow/waste/transport/hauling
- Structural
  - o Bridges and related abutments
  - o Pier penetrations of levee embankments
  - o Diaphragm walls
  - o Other structural components integral to the project
  - o Gates or other operable features
- Hydraulic and Hydrology
  - o Changes in inflow
  - o Changes in water surface profiles and flow distribution
  - o Assessment of local and system wide resultant impacts
  - o Upstream and downstream impacts of the proposed alterations, including Sediment transport analysis as needed
  - o Impacts to existing floodplain management
- Operation and Maintenance Requirements



- o Applicant facilities
  - Pre flood preparation
  - Post flood clean up
  - Sediment removal
- o Water control management plan
  - Impacts to other Federal projects within the basin
  - Corps facilities

3. Real Estate Analysis

- o Reference ER 405-1-12, Chapter 12, Sections I and II.
  - Include:
    - Description of all Lands, Easements and Rights of Way required for the modification, including proposed estates
    - Description of all Lands, Easements and Rights of Way owned as a part of the authorized project
    - Maps clearly depicting both required real estate and existing real estate limits
    - Navigational servitude, facility relocations, relocation housing assistance and any other relevant factors

4. Discussion of Residual Risk. Discuss the changes to the existing level of risk to life, property as a result of the modification. Will the project incur damages more frequently as a result of flooding that will require Federal assistance under PL 84-99? Risk analysis will be used as the method for communicating residual risk.

5. Administrative record [likely meaning the ROD] for key decisions for related actions for applicants proposed modification such as environmental reports, judges' decisions, permits, etc.

6. Discussion of Executive Order 11988 Considerations
- Justification to construct in the floodplain
  - No practicable alternative determination,<sup>23</sup> if Federal agency, Agency determination [and] Public Notice Notifications

7. Environmental Protection Compliance. All 408 actions must be in full compliance with all applicable Public laws, executive orders, rules and regulations, treaties, and other policy statements of the Federal government and all plans and constitutions, laws, directives, resolutions, gubernatorial directives, and other policy statements of States with jurisdiction in the planning area.<sup>24</sup> Examples are State

<sup>23</sup> As explained above, there is no basis in law for this requirement. Army Corps may believe that it must require this finding (which suggests the applicant must make a showing) based on the various requirements in 33 C.F.R. § 320.4 that state that the Army Corps “should” consider alternatives to permitting impacts to sensitive wetlands, and “should” avoid approving any project that would adversely impact floodplain resources when there are practicable alternatives that would avoid such impacts. It may also be the case that this requirement has been included under the assumption that any structure that would require a Major 408 would also impact wetlands and would therefore require a LEDPA determination. But that is not necessarily true.

<sup>24</sup> This overstates the legal basis for the requirement. As explained above, the public interest review requires an analysis of many of the same resources analyzed under state and federal environmental laws. It does not require compliance be demonstrated with all state, federal, and local laws whatever.

water and air quality regulations; State historic preservation plans; State lists of rare, threatened, or endangered species; and State comprehensive fish and wildlife management plans. The District must maintain full documentation of compliance as part of the administrative record. The submittal package provided to HQUSACE will document considerations with significant bearing on decisions regarding the 408 request. Typically the minimum submission will include the following:

- National Environmental Policy Act. (Including all resources listed in Section 122 of the River and Harbor Act 1970 must be considered).
- Endangered Species Act.
- Fish and Wildlife Coordination Act.
- Marine Protection, Research and Sanctuaries Act.
- Wild and Scenic Rivers Act.
- Coastal Zone Management Act.
- Clean Air Act. The submittal must include a determination that the proposed action is consistent with the State Implementation Plan of the affected jurisdiction(s), and concurrence of the appropriate regulatory agency; and the submittal must include a letter from the USEPA that they have reviewed and commented on the environmental impact evaluations including the NEPA documents.
- Hazardous Toxic Radioactive Waste (HTRW).
- National Historic Preservation Act. (It is not expected that actual mitigation will be completed but appropriate letters indicating completed Consultation determination of significance must be provided.)
- Noise Control Act (and draft mitigation plan if noise impacts may be significant).

## **2. Negotiated Major 408 Submittal Requirements.**

[To be revised and supplemented in light of future negotiations with Army Corps staff in light of unique project characteristics and design constraints. Mark McLoughlin to request example of "Major 408 Permit" submission from Ryan Larson or other staff member at Army Corps.]

As already explained to Army Corps staff, a 60% engineering level at such an early stage in the design-build process is not feasible.

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The presumption is that if the project complies with state and federal resource laws, that weighs heavily in favor of finding that it is not in conflict with the public interest. 33 C.F.R. § 320.4(j)(4). However, if any other state, local, or federal permit for the same work is denied, the Army Corps has discretion to deny the permit as not in the public interest, or to deny it "without prejudice," meaning the applicant may reinstate the 408 permitting process if and when the required state, local, or federal permit is obtained. 33 C.F.R. § 320.4(j)(1). However, the Army Corps may override a state, local, or tribal land use permit denial if it finds one or more "factors of overriding importance." 33 C.F.R. § 320.4(j)(2).

In addition, the Guidance and 2011 Draft Guidance suggest that issuance of the final Major 408 Permit is a prerequisite for issuance of the Clean Water Act Section 404 Permit (or, if applicable, a Section 10 Rivers and Harbors Act Permit).<sup>25</sup> But there appears to be no basis in law for such a requirement.

Because of the profound implications for project approval and construction, CHSRA should seek clarification from Army Corps that the 404 permit for any given HST section will not be held up pending approval of a Major 408 Permit. By Army Corps' own estimate, such a requirement would delay start of construction (at least where construction would impact jurisdictional waters of the United States) by 12 to 18 months, if not longer.

### **III. Coordination with Central Valley Flood Protection Board Encroachment Permit Application.**

Some Army Corps flood control structures are also within the jurisdiction of the CVFPB. Where the agencies have concurrent jurisdiction, the 408 Permit application and the CVFPB encroachment permit application should be coordinated to avoid duplicating effort, and to ensure consistency between the information provided to the two agencies in support of the respective permit applications. Ultimately, both permits will be required prior to construction at the site of the flood protection facility.

CVFPB has provided a Checklist of Common Items Required for Submittal of Encroachment Permit Applications to the Central Valley Flood Protection Board (Dec. 8, 2011) (attached). The list of information to be included in the encroachment permit submittal appears to overlap considerably with the Minor 408 Permit Submittal requirements being negotiated with the Army Corps, and as they appear in 2011 Draft Guidance (also attached).

Thus, it appears that coordinating submission of both permit applications is feasible. However, both Army Corps and CVFPB may require additional or slightly different information than they specify in their guidance if unusual circumstances are encountered at the location of a crossing/encroachment.

#### **A. CVFPB Encroachment Permit Regulatory Setting.**

Under Water Code section 8710, the CVFPB has approval authority over any excavation or construction “in the bed of or along or near the banks of the Sacramento or San Joaquin Rivers or any of their tributaries or connected therewith, or upon any land adjacent thereto, or within any of the overflow basins thereof, or upon any land susceptible to overflow therefrom . . . .”

Pursuant to Water Code sections 8571, 8608, and 8610.5, the CVFPB has promulgated regulations codified in Title 23 sections 1-193. Notably, CVFPB permitting jurisdiction extends to every proposal or plan of work that will occur “wholly or in part within any area for which there is an adopted plan of flood control.” 23 Cal. Code Regs. § 6(a). Indeed, it extends beyond the area where there is an adopted plan of flood control “if it is foreseeable [in the judgment of the Executive Officer] that the plan of work could be injurious to or interfere with the successful execution, functioning, or operation of any facilities of an adopted plan of flood control or of a plan

<sup>25</sup> ACOE 2008 Memo, Section 408 Submittal Package Guide at 5 (“After the 408 request is approved and the ROD is signed, the district may issue any needed Section 404/10 permits.”); 2011 Draft Guidance at 10, § 7.3 (requiring HQUSACE approval of Major 408 prior to District decision on Section 404 Permit and/or Section 10 Permit).

under study.” *Id.* § 6(c). The CVFPB has promulgated a table that lists the floodways under its jurisdiction. *Id.* § 112, Table 8.1. However, it requires permit applications for all proposed encroachments “on levees adjacent [to any floodways included in Table 8.1], [and] on any stream which may affect those floodways.” *Id.* § 112(a).

The jurisdiction of the CVFPB is not exclusive of Army Corps or local maintaining agency (LMA) jurisdiction. Thus, where CVFPB has jurisdiction, permits may also be required from Army Corps and any LMA with concurrent jurisdiction such as a reclamation district, drainage district, flood control district, levee district, state, county or city. 23 Cal. Code Regs. § 7(c). Indeed, prior to submission of an application for a CVFPB permit, the application must ordinarily be “endorsed” by the LMA, meaning the LMA must give its “conceptual plan approval, which may include recommended permit conditions of the [LMA].” *Id.* § 7(a)-(b). If the encroachment will be constructed or maintained upon lands owned in fee by the Sacramento and San Joaquin Drainage District, the work must also be “expressly permitted by a proper and revocable license, lease, easement, or agreement executed between the owner of the encroachment and the district, and upon payment to the district of its expenses and adequate rental or compensation therefor.” *Id.* § 19. In addition, “[a]ny proposed borrow operation within one mile of a state highway bridge must be approved by the California Department of Transportation.” *Id.* § 116(b)(18).

Subject to 12 exceptions, the CVFPB has delegated its permitting authority to the Executive Officer (EO). 23 Cal. Code Regs. § 5(a). Indeed, the EO “may waive the requirement for a permit for minor alterations within an adopted plan of flood control that would not be injurious to the adopted plan of flood control.” *Id.* § 6(e). Chief among the exceptions to EO permitting authority are permits “that significantly affect any element of the State Plan of Flood Control or other adopted plan of flood control”; permits for which approval is also required by the South Pacific Division or Headquarters of the Army Corps; and permits that “may create, in the judgment of the Executive Officer or Chief Engineer, more than a de minimis hydraulic impact to an adopted plan of flood control . . . .” *Id.* § 5(b)(1)-(3). In addition, § 5(b) lists encroachment permits that the CVFPB has determined do not significantly affect any element of any adopted plan of flood control. *See also* § 5(a)(1) (“Encroachments that do not significantly affect any element of [any adopted plan of flood control] are *defined* in subsection (b).” (Emphasis added)). The list does not include bridges. Therefore, if the CVFPB considers the list exhaustive, as suggested by the language in § 5(a)(1) quoted above, it may deem any permit application for construction of a bridge to require CVFPB action.

## **B. CVFPB Permit Application Requirements.**

In general, and subject to “minor variations” in the application requirements, an application must include:

- (1) A description of the proposed work, together with a statement of the dates the planned construction will be initiated and completed.
- (2) . . . [A] copy of any draft and final environmental review document prepared for the project . . . [including] mitigation for [any significant impacts].
- (3) Complete plans and specifications showing the proposed work, including a location map showing the site of the work with relation to topographic features; a plan view of the area; and adequate cross sections through the area of the proposed work. The plans must be drawn to scale and refer to National Geodetic Vertical Datum (NGVD), or other known datum. The plans must also indicate any

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project features such as levees and/or channels, roads, or other structures, and must show river mile or levee mile references. The dimensions of any proposed or existing fills, excavations, and construction must be given.

(4) Additional information, such as geotechnical exploration, soil testing, hydraulic or sediment transport studies, biological surveys, environmental surveys and other analyses may be required at any time prior to board action on the application.

(5) The names and addresses of all landowners of the property on which the project is located and all landowners adjacent to the property on which the project is located.

23 Cal. Code Regs. § 8(b); *see also* Checklist of Common Items Required for Submittal of Encroachment Permit Applications to the Central Valley Flood Protection Board (Dec. 8, 2011) (attached).

The application should also include any required LMA endorsement and proposed conditions of approval. 23 Cal. Code Regs. § 7(a)-(b). However, if the LMA denies the application or unreasonably delays its endorsement, the application may be submitted along with “a satisfactory explanation for lack of an endorsement,” and the CVFPB may proceed with its permitting process. *Id.* § 7(a).

The CVFPB may deny a permit for any of the reasons listed below; therefore, the application materials should be sure to address them:

(a) If the proposed work could:

- (1) Jeopardize directly or indirectly the physical integrity of levees or other works;
- (2) Obstruct, divert, redirect, or raise the surface level of design floods or flows, or the lesser flows for which protection is provided;
- (3) Cause significant adverse changes in water velocity or flow regimen;
- (4) Impair the inspection of floodways or project works;
- (5) Interfere with the maintenance of floodways or project works;
- (6) Interfere with the ability to engage in floodfighting, patrolling, or other flood emergency activities;
- (7) Increase the damaging effects of flood flows; or
- (8) Be injurious to, or interfere with, the successful execution, functioning, or operation of any adopted plan of flood control.
- (9) Adversely affect the State Plan of Flood Control, as defined in the Water Code.



(b) When the board is the lead agency under CEQA, and the proposed encroachment could result in potential and unmitigated significant environmental effects, including cumulative environmental effects.

(c) When the board is a responsible agency under CEQA, and the CEQA document is inadequate.

(d) If the applicant fails to supply information deemed necessary by the board for application purposes, including the names of all adjacent landowners.

(e) If the proposed work does not meet board standards contained in article 8.

(f) If there has been a failure by the applicant . . . to substantially comply with permit conditions on prior related permits or if there has been work performed without a permit and that work is not the subject of the pending permit application where the applicant has not supplied reasonable and convincing assurances that compliance with the board's regulations will be achieved.

23 Cal. Code Regs. § 15. In addition, unless a variance is granted, any proposed work must conform with the standards set forth in Article 8, 23 Cal. Code Regs. § 111-138. *Id.* §§ 15(e), 111. Thus, the application materials should demonstrate compliance with the applicable standards, or provide justification why a variance from an otherwise applicable standard is warranted. At a minimum, the standards set forth in sections 115 (dredge, spoil, and waste material), 116 (borrow and excavation activities—land and channel), 128 (bridges), and 130 (patrol roads and access ramps), and any potentially applicable “supplemental” standards (e.g., section 118, supplemental borrow standards for the Lower San Joaquin River Flood Control Project) should be considered in preparing an application.

Notably, for new bridges over CVFPB jurisdictional floodways, “[t]he bottom members (soffit) . . . must be at least three (3) feet above the design flood plane[.]” however, “[t]he required clearance may be reduced to two (2) feet on minor streams and sites where significant amounts of stream debris are unlikely[.]” or “[w]hen the clearance requirements above design flood plane would result in bridge approach ramp fill in the floodway, [in which case] the clearance requirement may be reduced to the extent that reasonably balances clearance and fill that would obstruct flow, so as to maintain maximum channel capacity.” 23 Cal. Code Regs. § 128(a)(10)(A), (C). In addition, vehicular access to the levee crown may be required (1) at each end of a bridge, and (2) from the levee crown to the floodway and or the landside levee toe beneath the bridge. *Id.* § 128(a)(11).

For additional details regarding CVFPB permit application requirements, the regulations should be consulted, including Appendix A at Article 10, 23 Cal. Code Regs. (General Information Regarding Applications for Encroachment Permits) as well as the attached Checklist received from CVFPB personnel.

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Attachments:

1. CECW-PB, Memorandum, Clarification Guidance on the Policy and Procedural Guidance for the Approval of Modifications and Alterations of Corps of Engineers Projects 2, § 3.a.(1) (Nov. 17, 2008) (ACOE 2008 Memo).

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2. ACOE, 13500 SWD QMS Approval of Alterations to Existing U.S. Army Corps of Engineers Public Works Projects 7, § 7.2 (Draft Ver. Jan. 20, 2011) (2011 Draft Guidance).
3. Checklist of Common Items Required for Submittal of Encroachment Permit Applications to the Central Valley Flood Protection Board (Dec. 8, 2011).



DEPARTMENT OF THE ARMY  
U.S. ARMY CORPS OF ENGINEERS  
WASHINGTON, D.C. 20314-1000

REPLY TO  
ATTENTION OF:

NOV 17 2008

CECW-PB

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Clarification Guidance on the Policy and Procedural Guidance for the Approval of Modifications and Alterations of Corps of Engineers Projects

1. References:

- a. CECW-PB Memorandum dated 23 October 2006, Policy and Procedural Guidance for the Approval of Modifications and Alterations of Corps of Engineers Projects.
- b. ER 1105-2-101, Planning - Risk Analysis for Flood Damage Reduction Studies, dated 3 January 2006.
- c. CECW-HS Memorandum dated January 23, 2008, Subject: Guidance for the Prioritization of Fiscal Year (FY 2008) Levee Safety Program Inspection Funds.
- d. EM 1110-2-1619, Risk Based Analysis for Flood Damage Reduction Studies, dated 1 August 1996.
- e. ER 1110-2-1150, Engineering and Design for Civil Works Projects, dated 31 August 1999.
- f. ER 1165-2-502, Delegation of Review and Approval Authority for Post-Authorization Decision Documents, dated 31 March 2007.
- g. ER 1105-2-100, Appendix H, Policy Compliance Review and Approval of Decision Documents, November 2007.
- h. ER 1110-1-12, Quality Management, dated 30 September 2006.

2. Purpose: The purpose of this memorandum is to provide additional clarification and to supplement reference 1a, which remains in effect. This memorandum addresses approval levels for various types of alterations/modifications under 33 U.S.C. 408; the application of risk analysis to the required engineering studies, review requirements, report processing requirements, and appropriate funding mechanisms and focuses primarily on flood risk management projects.

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3. Policy:

a. Application of 33 CFR 208.10 and 33 U.S.C. 408.

(1) 33 U.S.C. 408 authorizes the Secretary of the Army to permit alterations/modifications to existing Corps projects in certain circumstances. The Secretary of the Army has delegated this approval authority to the Chief of Engineers. In addition, the authority to approve relatively minor, low impact alterations/modifications related to the operation and maintenance (O&M) responsibilities of the non-Federal sponsors has been further delegated to the District Engineer for approval in accordance with 33 CFR 208.10. The types of alterations/modifications that can be approved by a District Engineer include placement of structures such as pump houses, stairs, pipes, bike trails, sidewalks, fences, driveways, power poles, and instrumentation provided these alterations/modifications do not adversely affect the functioning of the project and flood fighting activities. If proposed changes are limited to restoring the authorized level of protection or improving the structural integrity of the protection system and do not change the authorized structural geometry or hydraulic capacity, they may be approved in accordance with 33 CFR 208.10. The authorized level of protection is intended to be the top of the levee associated with the design water surface plus appropriate freeboard including consideration for subsidence. Alterations/modifications approved by the District Engineer in accordance with 33 CFR 208.10 are considered within the O&M responsibilities of the non-Federal sponsor and will be implemented by the non-Federal sponsor at no cost to the federal government and are not eligible for credit.

(2) The types of alterations/modifications under 33 U.S.C. 408 that require approval by the Chief of Engineers include degradations, raisings, and realignments and other alteration/modifications not discussed in paragraph 3a(1) above, to the flood protection system. In instances where it is not clear if the proposed alteration/modification is within the authority delegated to the District Engineer for approval in accordance with 33 CFR 208.10 or when the proposed alteration/modification requires approval by the Chief of Engineers, there must be an engineering analysis conducted with consideration of the full range of loading conditions to determine the impact of the alteration/modification on systems performance (flood elevations and structural integrity). Such alterations/modifications include non-Federal levee tie-ins, ramps, riverside landscaping, retaining walls, fill against a levee (such as railroad trestles and overbuild), bridges, relief wells, seepage berms, and stability berms. If the engineering analysis indicates that system performance is adversely impacted by the alteration/modification, then the proposed alteration/modification must be submitted for approval by the Chief of Engineers. The “system performance” includes the portions of the watershed above and

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below the proposed site of alterations/modifications to the extent that adverse impacts can be identified. "Adverse impacts" include any significant increase in risk to public safety.

(3) Regulatory approval under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899 for a structure within the waters of the United States does not, by itself, constitute approval for a project alteration/modification.

b. Risk Analysis.

(1) Non-Federal proposals to degrade, raise, or realign existing Corps projects under 33 U.S.C. 408 should be evaluated as new construction of Federal projects and the potential impact of these changes, including system impacts, must be evaluated in accordance with Corps regulations and policy. A risk analysis will be applied to all evaluations of alterations/modifications to Corps flood damage reduction projects to be approved under 33 U.S.C. 408 in accordance with ER 1105-2-101 and shall apply to the following:

(a) Projects, whether with or without Federal funding, where an ongoing or proposed study considers alternative solutions,

(b) Where the proposed alterations/modifications under 33 USC 408 may impact levees within the purview of forthcoming EC 1110-2- 6067 (formerly known as draft ETL 1110-2-570), Certification of Levee Systems for the National Flood Insurance Program (NFIP) dated 30 September 2008.

(c) Alterations/modifications for which the non-Federal sponsor requests or intends to request credit either under Section 104 of WRDA 1986 or Section 2003 of WRDA 2007.

(2) Risk analysis is not required when evaluating the performance of an existing system where consideration of alternative solutions, USACE certification, or credit are not involved. Even though ER 1105-2-101, Section 6, Variables in a Risk Analysis, includes geotechnical and structural analysis, the risk and uncertainty analysis for evaluation of potential system impacts is limited to the hydrologic and hydraulic parameters. Impacts will be determined by comparing performance parameters as presented in ER 1110-2-101 for the existing or base condition to the condition resulting from the project alteration/modification. The base performance conditions are defined by authorized project features. USACE has provided technical guidance in EM 1110-2-1619, but has yet to fully develop the guidance needed to analyze risk and uncertainty for the geotechnical and structural performance of a system. Until such guidance is developed, deterministic procedures are appropriate for demonstrating geotechnical and structural integrity under the full range of loading conditions. For loading conditions

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where flood waters exceed the level of protection, the analysis shall include a breach analysis to assess impacts within the system. Under no circumstances will the analysis assume failure of any component of the levee or flood wall system for the flood up to the top of protection as a means to relieving systems impacts.

(3) The district and the non-Federal sponsor should work together to provide an appropriate assessment that incorporates state of the art analyses of other areas of uncertainty. Specific areas of concern include seismic stability, impacts of the overtopping loading conditions and potential impacts to interior drainage. Specific to seismic stability, the studies need to demonstrate that under normal operating conditions failure will not result in unexpected release of flows that would impact project performance.

c. Review Requirements.

(1) All documents submitted by the non-Federal sponsor for consideration under 33 U.S.C. 408 will require an Agency Technical Review (ATR). The ATR may be accomplished by the home district in which the proposed alteration/modification is under consideration. Vertical team coordination is required to assure technical requirements are met throughout the process. This coordination can be accomplished through In-Progress-Reviews (IPR) and during interim draft documentation review.

(2) In addition, documents submitted by the non-Federal sponsor for consideration under 33 U.S.C. 408 that require approval by the Chief of Engineers must undergo a Type II Independent External Peer Review (this is the Safety Assurance Review (SAR) set out under Section 2035 of WRDA 2007) prior to submission of the request for approval to HQUSACE. When the Corps is concurrently performing investigations that will entail a safety assurance review, the SAR for the overarching study will suffice but must be completed prior to initiation of construction. In cases where no Corps investigations are ongoing, an SAR on the proposed alteration/modification must be performed. The SAR must be performed by the non-Federal sponsor prior to a request for approval of the proposed alteration/modification. Guidance on the conduct of Independent External Peer Reviews, including Type II SAR's, is under development and will be forthcoming.

(3) Nothing in this guidance alters Division or District quality management responsibilities in accordance with ER 1110-1-12 and any associated regional guidance.

d. Report Review and Approval.

(1) Requests for approval by the Chief of Engineers of proposed alterations/modifications of an existing Corps project and the supporting documentation



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will be forwarded to the appropriate HQUSACE Regional Integration Team (RIT). The final decision document products shall include supporting Engineering analyses to the level of detail for preconstruction engineering and design in accordance with ER 1110-2-1150. ER 1110-2-1150 is being updated and is forthcoming. The submittal package will also include the District's memorandum requesting approval and the MSC endorsement of the request as well as the items listed in paragraph 5 of reference 1.a. and the following items:

- (a) A description of all other flood and/or storm risk management actions in the watershed, including current operations and proposed changes actively underway or planned for the future;
- (b) A copy of any related credit requests and a description of the sponsor's intent to seek credit and/or reimbursement, if applicable;
- (c) A risk analysis of the proposed alterations/modifications in accordance with ER 1105-2-101;
- (d) The District's analysis of the policy and legal compliance aspects of the proposed alterations/modifications;
- (e) The District Engineer's determination that the proposed alterations/modifications will meet USACE engineering and safety standards, and will not have significant adverse affects on the functioning of the protective facilities; and
- (f) A copy of any prior HQUSACE guidance regarding alterations/modifications of the project and other damage reduction projects in the watershed.

(2) The RIT will forward the submittal package to CECW-PC for a policy compliance review in accordance with the paragraph 5 of reference 1 a. and the attached Section 408 Submittal Checklist. The policy compliance review results will be provided to the Chief of Engineers or designee prior to approval. The RIT will coordinate the results, as needed, to correct or improve the package as necessary to address significant concerns.

e. Funding.

At this time, funds have not been specifically appropriated by line item for review of proposals under 33 U.S.C. 408. Potentially available sources of funds for review activities include Inspection of Completed Works (ICW) funds and, if there is an ongoing funded project activity directly related to the 408 proposal, project funds. In certain circumstances for alterations/modifications necessary for Federal transportation projects,

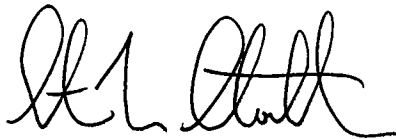
SUBJECT: Clarification Guidance on the Policy and Procedural Guidance for the Approval of Modifications and Alterations of Corps of Engineers Projects

USACE may accept and expend funds provided by an State DOT agency pursuant to section 139(j) of Public Law 109-59 (codified at 33 U.S.C. 139(j)) provided the Secretary of Transportation finds such review activities directly and meaningfully contribute to an underlying transportation project. In such cases, USACE only may accept funds in amounts necessary to permit USACE to meet the time limits for environmental review established for the project and only may accept funds for activities beyond the normal and ordinary capabilities permitted by USACE's general appropriations. HQUSACE will continue to investigate other avenues of funding for Corps activities under 33 U.S.C. 408.

4. Vertical Teaming: Since it is impossible to anticipate each and every scenario, vertical teaming is a must when there is doubt as to the appropriate course of action related to the application of this guidance. Please coordinate through the appropriate HQUSACE's RIT as needed to ensure that analyses and submittals are in accordance with policy. A guide has been enclosed to help identify the minimum required actions. Other actions should be addressed as appropriate.

FOR THE COMMANDER:

Encl



STEVEN L. STOCKTON, P.E.  
Director of Civil Works

DISTRIBUTION:  
(See pages 7 and 8)

**Final**  
**11/12/08**

### **Section 408 Submittal Package Guide**

This guide is intended to ensure a complete submittal, aid the review process and serve as a guide for sponsors/applicants requesting approval of significant modifications or alterations to a locally or federally maintained Corps project requiring Chief of Engineers approval under 33 USC 408. Incomplete submittals will delay processing of applicant requests. This information will be submitted to the MSC for quality assurance review prior to making any recommendations to HQUSACE.

#### **Applicant (Normally the Non-Federal Sponsor) Prepared Documents**

**1. Written request for approval of the project modification**

- A detailed description of the proposed modification
- The purpose/need for the modification
- An appropriate map or drawing

**2. Technical Analysis and Adequacy of Design.** All necessary technical analysis should be provided. The list below is only a guide for typical items that would routinely be expected and is not intended to list every item that could be needed to make this determination.

- Geotechnical Evaluation.
  - Stability
  - Under seepage
  - Erosion Control
  - Vegetation
  - Material usage/borrow/waste/transport/hauling
- Structural
  - Bridges and related abutments
  - Pier penetrations of levee embankments
  - Diaphragm walls
  - Other structural components integral to the project
  - Gates or other operable features
- Hydraulic and Hydrology
  - Changes in inflow
  - Changes in water surface profiles and flow distribution
  - Assessment of local and system wide resultant impacts
  - Upstream and downstream impacts of the proposed alterations, including Sediment transport analysis as needed
  - Impacts to existing floodplain management

- Operation and Maintenance Requirements
  - Applicant facilities
    - Pre flood preparation
    - Post flood clean up
    - Sediment removal
  - Water control management plan
    - Impacts to other Federal projects within the basin
    - Corps facilities

### 3. Real Estate Analysis

- Reference ER 405-1-12, Chapter 12, Sections I and II.
  - Include:
    - Description of all Lands, Easements and Rights of Way required for the modification, including proposed estates
    - Description of all Lands, Easements and Rights of Way owned as a part of the authorized project
    - Maps clearly depicting both required real estate and existing real estate limits
    - Navigational servitude, facility relocations, relocation housing assistance and any other relevant factors

4. Discussion of Residual Risk. Discuss the changes to the existing level of risk to life, property as a result of the modification. Will the project incur damages more frequently as a result of flooding that will require Federal assistance under PL 84-99? Risk analysis will be used as the method for communicating residual risk.

5. Administrative record for key decisions for related actions for applicants proposed modification such as environmental reports, judges' decisions, permits, etc.

### 6. Discussion of Executive Order 11988 Considerations

- Justification to construct in the floodplain
  - No practicable alternative determination, if Federal agency, Agency determination.
- Public Notice Notifications

7. Environmental Protection Compliance. All 408 actions must be in full compliance with all applicable Public laws, executive orders, rules and regulations, treaties, and other policy statements of the Federal government and all plans and constitutions, laws, directives, resolutions, gubernatorial directives, and other policy statements of States with jurisdiction in the planning area. Examples are State water and air quality regulations; State historic preservation plans; State lists of rare, threatened, or endangered species; and State comprehensive fish and wildlife management plans. The District must maintain full documentation of compliance as part of the administrative record. The submittal package provided to HQUSACE will document considerations with significant bearing on decisions regarding the 408 request. Typically the minimum submission will include the following:

- National Environmental Policy Act. The appropriate NEPA process will be determined by the district in consultation with agencies that regulate resources that may be affected by the proposed action. All resources listed in Section 122 of the Rivers and Harbors Act 1970 must be considered. The evaluation will include a description and analysis of project alternatives, the

significance of the effects of each alternative on significant resources. Direct, indirect, and cumulative effects of all reasonably foreseeable actions including the actions of others and natural succession must be considered and documented. A risk analysis must be completed to determine the significance of risks to human life & safety, and property. Mitigation plans must be well described. If Federal funds are or may be involved the mitigation plan must be incrementally justified. NEPA documents will be consistent with 33 CFR 230.

- Endangered Species Act. Coordination/consultation with the US Fish and Wildlife Service and/or NOAA Marine Fisheries Service must be complete. Each agency with jurisdiction over a species that may be affected by the proposed action must provide a letter/memo indicating completion of ESA coordination. This documentation may range from a memo saying no ESA protected species or habitats are in the project impact area through a Biological Opinion.
- Fish and Wildlife Coordination Act. Either a Final FWCA Report or a letter from the USFWS stating that a FWCA Report is not required must be included.
- Marine Protection, Research and Sanctuaries Act For projects involving ocean disposal, or dredged material disposal within the territorial seas, the discharge will be evaluated under Section 103 of the MPRSA. The disposal must meet the criteria established by the EPA (40 C.F.R. 227 and 228). The submittal will document that that materials to be discharged are consistent with the current criteria and the disposal site is suitable.
- Wild and Scenic Rivers Act. The submittal will document efforts to identify designated rivers or river reaches (including potential rivers) in the vicinity of the project, and describe follow-up coordination with the agency having management responsibility for the particular river. If a designated river reach is affected, a letter indicating completed coordination is required from the managing agency.
- Coastal Zone Management Act. If the proposed action is in a coastal zone documentation of a "determination of consistency" with the state coastal zone management program the appropriate State agency (16 U.S.C 1456) must be included.
- Clean Air Act. This is a two-part compliance process. First, the submittal must include a determination that the proposed action is consistent with the Implementation Plan of the affected jurisdiction(s), and concurrence of the appropriate regulatory agency, or a conditional permit. Second, the submittal must include a letter from the USEPA that they have reviewed and commented on the environmental impact evaluations including the NEPA documents.
- HTRW. HTRW includes but is not limited to the Comprehensive Environmental Response, Compensation and Liability Act, the Resource Conservation and Recovery Act, and the Toxic Substances Control Act. The submittal package must include documentation that the USEPA and appropriate State and Tribal agencies with jurisdiction or expertise have been given reasonable opportunity to comment on the proposed action and that their input has been fully considered. The Corps will not incur additional liability related to HTRW.
- National Historic Preservation Act. This includes all other applicable historic and cultural protection statutes. The submittal package will include documentation that the Advisory Council on Historic Preservation, and appropriate State and Tribal agencies with jurisdiction or expertise has been given a reasonable opportunity to comment on the proposed action and that their input

has been fully considered. It is not expected that actual mitigation will be completed but appropriate letters indicating completed Consultation determination of significance must be provided.

- Noise Control Act. Documentation of the significance of noise likely to be generated during construction of the proposed project and the noise that may result due to implementation must be provided. If significant noise may result, a noise mitigation plan must be provided.

### District Prepared Documents and Analysis of Applicants Request to be submitted to MSC

1. Transmittal letter to MSC Commander with district's determination of technical soundness and environmental acceptability.

a. A physical and functional description of the existing project

1. Name of authorized project
2. authorizing document
3. Law/Section/Date of project authorization
4. Law Sections/Dates of any post-authorization modifications
5. Non-Federal sponsor
6. Congressional Interests (Senator(s), Representative(s) and District(s))

b. Project Documents:

1. Type of Decision Document:
2. Agency Technical Review (ATR) approval Date
3. Independent External Peer Review (IEPR) approval date

c. Policy, Legal and Technical Analysis:

1. Is the original project authority adequate to complete the project as proposed?
2. Has the District Counsel reviewed and approved the decision document for legal sufficiency?
3. Have all aspects of ATR been completed with no unresolved issues remaining?
4. Have the District Commander documented policy/legal/technical compliance of the decision document?

d. Written request for approval of the project modification (applicant prepared)

1. A detailed description of the proposed modification
2. The purpose/need/rationale for the modification

e. A description of any related, ongoing Corps studies and studies by others within the watershed

f. A description and listing of other Corps projects, ongoing and completed, in the watershed

g. A description of any projected/anticipated credit (section 215/104, etc.) for project modification work and date credit agreement(s) signed

h. Sponsor letter of understanding of their responsibility to perform all required OMRR&R for project modifications. For approved alterations/modifications, the non-Federal sponsor shall revise/update the



O&M Manual to reflect the non-Federal O&M responsibilities and the O&M Manual shall be approved by the District Engineer.

i. Real Estate Analysis Review (District/Division)

j. Agency Technical Review (ATR), ER 1110-1-12 para. 3-8. (District coordinates review)

Provide a description of the technical review team, consolidate and analyze their comments, resolution of comments and district commentary on adequacy of technical support and submit to MSC. This is the section 408 technical analysis. *Prior coordination with MSC is required to determine ATR requirements for each submittal. New Quality Management ER under review will require all Agency Technical Review (ATR), formerly ITR, .*

2. If there is an associated Section 404/10 permit action, the required public interest and technical evaluations under 33 USC 408 can be done concurrently with that action. Upon completion of the public interest determination and of the technical analyses regarding the impact of the proposed modification on the usefulness of the project, the District Engineer will make a recommendation (with supporting documentation) through the Division Commander to the Chief of Engineers (Attn: Appropriate RIT) for his consideration and approval under 33 USC 408. The District Engineer will make the final Section 404/10 permit decisions following the Chief of Engineers decision under 33 USC 408.

- Where the 408 action requires an EIS and the Corps is the Lead Agency the District will draft the ROD, but it will not be signed until the Corps has completed its 408 analysis *and the Chief of Engineer's has issued 408 approval*. The Corps' ROD and the 408 request will be processed as concurrently as possible to reduce the delay between the 408 decision and ROD. Since the 408 approval requires the highest level of approval, the ROD will be signed in HQUSACE. After the 408 request is approved and the ROD is signed, the district may issue any needed Section 404/10 permits.
- Where the 408 action requires an EA and FONSI, the Corps is the lead Federal agency the District will prepare the EA and the District Engineer will draft the FONSI analyzing the 408 request and any other Corps action, and submit it to the Chief of Engineers for review and approval. After the 408 authorization is signed by the Chief of Engineers the District Engineer may sign the FONSI and issue any needed Section 404/10 permits


3. Coordination of Section 404/10 and NEPA compliance with 408 requests When Other Agencies are Involved

- HQUSACE has determined that the EIS for projects led by another Federal agency and including a component requiring Corps 408 authorization will require two RODs. The Lead Agency under NEPA will prepare a ROD for the overall project. The Corps would be a Cooperating Agency and thus be allowed to adopt the Lead Agency's EIS. The second ROD, will be specific to the Corps' actions, including the 408 approval and/or Section 404/10 permits. The District will draft the ROD, but it will not be signed until the Corps has completed its 408 analysis *and the Chief of Engineer's has issued 408 approval*. The Corps' ROD and the 408 request will be processed as concurrently as possible to reduce the delay between the 408 decision and ROD. Since the 408 approval requires the highest level of approval, the ROD will be signed in HQUSACE. After the 408 request is approved and the ROD is signed, the district may issue any needed Section 404/10 permits.

## MSC prepared documentation and analysis of District submission

### Policy and Legal Compliance Review

1. Has the MSC certified the legal/policy/technical and quality management of the decision document?
  2. MSC Legal certification approval date
  3. MSC certification of policy compliance date
- .

 <p><b>US Army Corps of Engineers</b></p>	<p align="center"><b>13500 SWD QMS</b></p> <p align="center"><b>Approval of Alterations to Existing U.S. Army Corps of Engineers Public Works Projects</b></p>	
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**1.0 Purpose.** This standard describes the process for review and approval of alteration of existing U.S. Army Corps of Engineers public works projects. Public works projects include U.S. Army Corps of Engineers dams and local flood protection works constructed by the United States for which Non-Federal Sponsors (State, City, or other agency) have the responsibilities for operation and maintenance. This standard also addresses the use of the appropriate authority and the proper level of approval.

**2.0 Applicability.** This standard applies to all existing public works projects including those for which a letter of assurance agreeing to the operation and maintenance of the project has been furnished by the project Local Sponsor.

### 3.0 References.

- a) 33 USC Section 408 (herein "Section 408"). Authorized in Section 14 of the River and Harbors Appropriation Act of 1899. US Code, Title 33 Navigation and Navigable Waters, Chapter 9: Protection of Navigable Waters and of Harbor and River Improvements Generally, Section 408: Taking possession of, use of, or injury to harbor or river improvements. This reference establishes the Federal authority for approval of all alterations of U.S. Army Corps of Engineers (USACE) local flood protection projects.
- b) 33 CFR Part 208, Section 208.10 (herein "Section 208.10"). US Code of Federal Regulations, Title 33 Navigation and Navigable Waters, Part 208: Flood Control Regulations, Section 208.10: Local flood protection works; maintenance and operation of structures and facilities.

- c) 33 CFR Part 320, Section 320.4: U.S. Army Corps of Engineers Regulatory Regulations including US Code of Federal Regulations, Title 33 Navigation and Navigable Waters, Part 320: General Regulatory Policies, Section 320.4: General policies for evaluating permit applications.
- d) Section 404 of the Clean Water Act (Section 404).
- e) Section 10 of the River and Harbors Act of 1899 (Section 10).
- f) EC 1165-2-209 Water Resources Policies and Authorities - Civil Works Review Policy.
- g) ER 1165-2-119 Modifications to Completed Projects, 20 September 1982.
- h) Assistant Secretary of the Army (Civil Works) Memorandum for the Chief of Engineers, Subject: Delegation of Authority Pursuant to 33 U.S.C. 408, 16 April 2004.
- i) CECW-PB Memorandum Policy and Procedural Guidance for the Approval of Modifications and Alterations of Corps of Engineers Projects, 23 October 2006.
- j) CECW-PB Memorandum Clarification Guidance on the Policy and Procedural Guidance for the Approval of Modifications and Alterations of Corps of Engineers Projects, 17 November 2008.
- k) Chief of Engineers Memorandum for the Director of Civil Works, Subject: Delegation of Authority Pursuant to Section 408, 2 April 2009.
- l) CECW-PB Memorandum Delegation of Authority to District Commanders to Approve Pursuant to 33 U.S.C. 408 Those Minor, Low Impact Modifications to Flood Protection Works Operated and Maintained by Non-Federal Sponsors Previously Being Considered under 33 CFR 208.10(a)(5), 18 June 2010.
- m) CECW-PB Memorandum Implementation Guidance for Utilizing Section 214 of the Water Resources Development Act of 2000, as amended to Accept Funding from Non-Federal Public Entities to Expedite the Evaluation of Permits pursuant to 33 U.S.C. 408.
- n) SWFP 1150-2-1, Criteria for Construction Within the Limits of Existing Federal Flood Protection Projects, September 2003.

#### **4.0 Related Procedures.**

- a) ER 1105-2-101, Planning – Risk Analysis for Flood Damage Reduction Studies, 3 January 2003.

- b) CECW-HS Memorandum, Subject: Guidance for the Prioritization of Fiscal Year (FY 2008) Levee Safety Program Inspection Funds January 23, 2008.
- c) EM 1110-2-1619, Risk Based Analysis for Flood Damage Reduction Studies, 1 August 1999.
- d) ER 1110-2-1150, Engineering and Design for Civil Works Projects, 31 August 1999.
- e) ER 1165-2-502 Delegation of Review and Approval Authority for Post-Authorization Decision Documents, 31 March 2007.
- f) ER 1005-2-100, Appendix H, Policy Compliance Review and Approval of Decisions Documents, November 2007.
- g) ER 1110-1-12, Quality Management, 30 September 2006.

## **5.0 Definitions.**

**Agency Technical Review (ATR).** An in-depth review, managed within USACE, and conducted by a qualified team outside of the home district that is not involved in the day-to-day production of the project/product. The purpose of this review is to ensure the proper application of clearly established criteria, regulations, laws, codes, principles, and professional practices.

**Environmental Assessment (EA).** A study to determine whether an action is a major federal action significantly affecting the quality of the human environment. An EA considers not only the existing conditions, but the effects of a proposed project upon those resources. Depending on the findings of an EA, an Environmental Impact Statement (EIS) may or may not be needed.

**Finding of No Significant Impact (FONSI).** A Finding of No Significant Impact (FONSI) presents the reasons why an action will not have a significant effect on the human environment. It must include the EA summary of the EA that supports the FONSI determination.

**Independent External Peer Review (IEPR).** A concept of a review of technical or scientific merit by individuals with sufficient technical competence and no unresolved conflict of interest.

**Office of Water Project Review (OWPR).** See Regional Integration Team (RIT).

**Regional Integration Team (RIT).** The HQUSACE function that receives, reviews, and processes alteration requests delivered from the USACE Division offices. This function will forward completed submittal packages to CECW-PC (Office of Water Project Review) for a policy compliance review. The RIT will coordinate the results, as needed, to correct or improve the package and address significant concerns.

**Record of Decision (ROD).** A document separate from, but associated with, an environmental impact statement that publicly and officially discloses the responsible official's decision as to which alternative assessed in the EIS is to be implemented.

**Safety Assurance Review (SAR).** Same as IEPR as set out under Section 2035 of WRDA 2007.

See [Glossary](#) for further definitions and acronyms.

## **6.0 Responsibilities.**

### **Operations Division – Maintenance Section:**

- Receives requests and assigns a District point-of contact (POC).
- Develops a District Project Delivery Team responsible for review of proposed alteration.
- Liaisons with the Non-Federal Sponsor to ensure the proposed alteration submittal is complete and processed appropriately.
- Develops the Decision Paper and Approval Letter.
- Coordinates an ATR and drafts FONSI or ROD(s) as appropriate and if required.
- Drafts Transmittal letter to Major Subordinate Command (MSC) and coordinates with all applicable offices.

### **Project Delivery Team (PDT):**

- Evaluates the proposed alteration submittal for Section 404 permit and initiates as appropriate.
- Determines if a Technical Analysis of the proposed alteration submittal is sufficient and requests additional information as necessary.
- Recommends the proposed alteration submittal as either a Major 408 or Minor 408.
- PER makes a Section 404 and/or Section 10 permit decision as applicable.
- Conducts a Quality Management Review, Real Estate Analysis Review, and Risk/Uncertainty Analysis if the project request is determined to be a Major 408.

### **Levee Safety Officer/Dam Safety Officer (LSO/DSO):**

- Evaluates proposed alteration submittal using current USACE guidance to determine impact to the functionality of the project with the support of the District Project Delivery Team.
- Makes recommendations to the District Engineer (DE) regarding appropriate approval authority.

### **District Engineer (DE):**

- Makes the final decision regarding approval authority, e.g. Major 408, Minor 408.
- Approves or Disapproves Minor 408 alterations via letter to the Non-Federal Sponsor.
- Makes recommendation for Approval and forwards Environmental Assessment and FONSI to Division Commander if the project is determined to require Major 408 approval,



- Signs FONSI and makes Section 404 and /or Section 10 permit decisions as applicable if proposed alteration submittal is approved by HQUSACE,
- Approves the Operation and Maintenance Manual revisions developed by the Local Sponsor.

### **Regional Integration Team (RIT):**

- Receives the final decision document products supporting Engineering analyses to the level of detail for preconstruction engineering and design in accordance with ER 1110-2-1150.
- Forwards the proposed alteration submittal to CECW-PC for a policy compliance review.
- Coordinates the results of the policy compliance review and, as needed, correct or improve the proposed alteration submittal as necessary to address significant concerns.

### **Non-Federal Sponsor:**

- Operates, inspects, and maintains completed public works project.
- Submits a Sponsor Letter of Understanding to USACE District, stating responsibility to perform all required Operation and Maintenance, Repair, Replacement, and Rehabilitation for approved project alterations.
- Revises and updates the project Operation and Maintenance Manual as required to incorporate approved alterations and associated responsibilities.
- Submits all requests for proposed alterations to the Operations Division-Maintenance Section including impacts to waters of the United States regulated under Section 404 and Section 10 if applicable.
- Coordinates with the entity (public or private) proposing the alteration to develop sufficient information of the proposed alteration before submittal to USACE.
- Ensures the need for, and reasonable and practicable alternatives to, the proposed alteration.
- Ensures sufficient technical information of the proposed alteration is submitted to USACE for proper and timely evaluation.
- Acts as liaison with entity proposing the alteration to obtain additional information required for USACE evaluation.
- Ensure the completion of Real Estate Analysis, Discussion of Residual Risk, Administrative Record for Key decisions, Discussion of Executive Order 11988 considerations and documented Environmental Protection Compliance if processed under Major Section 408.
- Ensure the completion of Type II Independent External Peer Review (IEPR) or Safety Assurance Review (SAR) if processed under Major 408.

## **7.0 Procedures.**

Nothing in this document shall replace or reduce the requirements as identified in U.S. Codes or CECW-PB Memorandums.

**7.1 Authority.** The sole authority for USACE approval of alterations to public works projects operated and maintained by Non-Federal Sponsors is Section 408. Section 408, authorized in the Rivers and Harbors Act of 1899 and as amended in 1985 to include “public works”, allowed the

Secretary of the Army to grant permission to alter public works so long as the alteration did not impair the usefulness of the project and was not injurious to the public interest. Section 408 establishes the Secretary of the Army with authority to approve alterations of Federal flood protection projects based on the recommendation of the USACE Chief of Engineers. In April 2004, the Assistant Secretary of the Army (Civil Works) delegated the Section 408 approval authority to the USACE Chief of Engineers and further authorized re-delegation to the USACE Director of Civil Works, or Division or District Commanders. In April 2009, this approval authority was delegated from the USACE Chief of Engineers to the USACE Director of Civil Works (reference 1.k.). In June 2010, the USACE Director of Civil Works memorandum delegated approval under Section 408 of “minor, low impact modifications” to the District Engineer.

Minor, low impact alterations related to the operation and maintenance responsibilities of the non-Federal sponsor has been further delegated to the District Engineer for approval in accordance with 33 CFR 208.10. Alterations approved by the District Engineer in accordance with 33 CFR 208.10 are considered part of the non-Federal Sponsor’s operation and maintenance responsibilities and will be implemented by the non-federal sponsor at no cost to the federal government and are not eligible for credit..

Based on the authority in 7.1, there are two different categories of approval for proposed alterations. They are: Major 408 and Minor 408. These are explained below.

## **7.1 The Review and Approval Process.**

*A request for alteration to a public works project that consists of a significant change to the authorized project scope, project purpose, or functionality is defined as a Major 408 and shall require approval by the USACE Director of Civil Works. Note that adverse impacts to project functionality include any significant increase in risk to public safety. If a proposed alteration does not meet this standard, it is defined as a Minor 408 and shall require approval by the District Engineer.*

Each request for an alteration will be evaluated on a case-by-case basis. Determination of the applicable category (Major 408 or Minor 408) for the proposed alteration shall be made by the District Engineer once sufficient information is provided. It is the responsibility of the Levee Safety Officer/Dam Safety Officer (LSO/DSO), supported by the Project Delivery Team technical staff, to evaluate proposed alterations to the standards identified in the box above, (using current USACE guidance, criteria, and staff experience), and make recommendations to the District Engineer. The District Engineer will inform the Non-Federal Sponsor of the determination via letter.

Final construction approval of a Major 408 alteration (after all of the required information is submitted and the review process has ended) will be granted by the Director of Civil Works at HQUSACE. Final construction approval of a Minor 408 alteration will be granted by the District Engineer via letter to the Non-Federal Sponsor. Further, these approvals should follow approval of the Section 408 by HQUSACE. The District Engineer will make a Section 404 and/or permit decision after the Section 408 approval.

U. S. Army Corps of Engineers regulatory permit approval, if applicable, under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act of 1899 for a structure within waters of the United States does not, by itself, constitute authority for construction.

**7.2 General.** The initiation of the review and approval process for proposed alterations begins with the Non-Federal Sponsor. Inherent in the Non-Federal Sponsor's responsibilities are the protection of the integrity of the public works project and the minimization of risks to public safety. In this regard, the Non-Federal Sponsor serves as the initial point-of-contact through which all requests for alterations are directed. The need for the alteration must be clearly demonstrated and reasonable and practicable alternatives to the proposed alteration that avoids impacts to the public works project must be considered and presented to the District. If an alteration is determined necessary, and there are no reasonable and practicable alternatives to locating the proposed project outside of the public works project, then the Non-Federal Sponsor, in collaboration with District, must ensure that the proposed design is developed to minimize impacts to the protective facilities and that sufficient information is included in the request to facilitate comprehensive evaluation of potential impacts to system performance for the determination of appropriate approval authority. A fundamental part of the Non-Federal Sponsor role is coordination with the specific entity (public or private) that is responsible for the design of the proposed alteration to develop sufficient project-specific information. Participation of this third party entity is necessary and inherent throughout the review process.

**7.3 Major 408.** Sufficient technical information of the proposed alteration must be submitted to the USACE for proper and timely evaluation. Coordination efforts between District and the Non-Federal Sponsor will vary depending on the scope of the proposed alteration. The Major 408 review and evaluation process is more comprehensive than the Minor 408 processes. In addition to the submittal to the District of the impacts of the proposed alteration to flood conveyance, structural integrity, operation and maintenance, flood fighting capabilities, construction plans and specifications, a significant amount of supplemental information is required. The proposed alteration will be evaluated for NEPA compliance and risk assessment. Refer to Attachment A for the Major 408 submittal requirements.

Submittal of the required information for a Section 404 permit and/or a Section 10 permit review during the Major 408 submittal process will expedite the District permit decision. The District Regulatory Branch in some cases may have issued a General Permit for the Modification or Alterations of Corps of Engineers Projects. The purpose of the General Permit is to eliminate unnecessary duplication of work where the environmental consequences of the action are individually and cumulatively minimal. To use the permit, the applicant must meet the conditions of the General Permit during the Major 408 approval process.

### **7.3.1 Specific Major 408 Requirements.**

**7.3.1.1 Risk Analysis.** A risk analysis will be applied to all evaluations of Major 408 alterations to District local flood protection projects in accordance with Engineering Regulation ER-1105-2-101. ER 1105-2-101, "Section 6, Variables in a Risk Analysis", includes geotechnical and structural analysis, however, the risk and uncertainty analysis for evaluation of potential system impacts is limited to the hydrologic and hydraulic parameters. Impacts will be determined by comparing performance parameters as presented in ER 1110-2-101 for the existing or base

condition to the condition resulting from the proposed alteration. The base performance conditions are defined by authorized project features. The USACE has provided technical guidance in Engineering Manual EM 1110-2- 1619, but has yet to fully develop the guidance needed to analyze risk and uncertainty for the geotechnical and structural performance of a system. Until such guidance is developed, deterministic procedures are appropriate for demonstrating geotechnical and structural integrity under the full range of loading conditions. Where flood waters exceed the level of protection, the analysis shall include a breach analysis to assess impacts within the system. Under no circumstances will the analysis assume failure of any component of the flood protection project, including levees or flood wall systems as a means to relieving systems impacts.

**7.3.2 Safety Assurance Review.** A Safety Assurance Review (SAR) is required for evaluations of Major 408 alterations to USACE public works projects. Guidance for preparing a SAR Plan and conducting a SAR is found in Engineering Circular EC 1165-2-209. The SAR is conducted by the Non-Federal Sponsor and serves to inform the USACE Chief of Engineers on the adequacy, appropriateness, and acceptability of the design and construction activity for the purpose of assuring that good science, sound engineering, public health, safety, and welfare are the most important factors that are used in the assessment of a proposed alteration. The SAR is performed during design and construction by an independent panel of experts. The Non-Federal Sponsor will prepare a SAR Plan and identify the independent panel of experts for USACE approval.

**7.3.3 National Environmental Policy Act (NEPA).** It is recommended that the Major 408 technical evaluation data and environmental protection compliance data be integrated into one decision document to facilitate a timely, concurrent review. The District staff is available to aid in preparing a suggested outline for documentation and submittal of the required Major 408 data.

If the proposed alteration requires a Section 404 permit and/or a Section 10 permit, the required public interest and technical evaluations may be done concurrently. If the Major 408 requires an Environmental Impact Statement (EIS) and USACE is the lead agency, the District will draft the Record of Decision (ROD) but it will not be signed until the District has completed the Major 408 process and the USACE Director of Civil Works has signed the Major 408 authorization. If the Major 408 requires an Environmental Assessment (EA) and Finding of No Significant Impact (FONSI), the District will forward the EA and a draft FONSI with the Major 408 package to the USACE Director of Civil Works for review and approval. After the Major 408 authorization is signed by the USACE Director of Civil Works, the District Engineer may sign the FONSI and making a permit decision regarding the Section 404 and/or the Section 10 permits.

The submittal requirements for projects that require USACE Director of Civil Works approval pursuant to a Major 408 require a public interest determination and a more comprehensive technical and risk analysis. Compliance with the NEPA and other applicable environmental laws and conducting of associated public/agency review is required for all Major Section 408 decisions.

NEPA includes compliance with several laws. For alterations requiring a Section 404 and/or Section 10 permit, the NEPA document may serve as the basis for both the Major 408 and

Section 404 and/or Section 10 permit decisions. As such, it must meet the requirements for both NEPA flood control (civil works) and USACE Regulatory (purpose and need, 404(b) (1)).

Specific NEPA process milestones are as follows:

- Non-Federal Sponsor must prepare proper NEPA documentation (EA or Environmental Impact Statement (EIS))
- Non-Federal Sponsor must ensure preparation of the necessary Endangered Species Act documentation (Biological Assessment)
- Non-Federal Sponsor must ensure preparation of the necessary regulatory documentation, such as a 404(b) (1) analysis, if needed.
- Non-Federal Sponsor shall assist USACE in consultation but USACE is the consulting agency and is the lead for this action
- USACE requires completed Endangered Species Act (ESA) consultation prior to submittal of Major 408 package - this may be a Biological Opinion or Letter of Concurrence.
- The final public comment period must be closed prior to submitting the Major 408 package
- The District will prepare a draft FONSI or ROD prior to submittal of the Major 408 package
- The NEPA document and consultation document is enclosed in the Major 408 package
- The FONSI or ROD is not issued until Major 408 approval is provided by USACE Director of Civil Works.
- If a general permit is available, this may fulfill the Section 404 and/or Section 10 permit NEPA requirement.

**7.3.4 Agency Technical Review (ATR).** All documents submitted by the Non-Federal Sponsor for consideration under Major 408 will require an ATR. The ATR is performed by the home USACE District. Vertical team coordination is required to assure technical requirements are met throughout the process. This coordination can be accomplished through In-Progress Reviews (IPR) and during interim draft documentation review.

**7.3.5 Approval.** Processing of the Major 408 will occur once all of the following have occurred or have been prepared:

- Letter requesting Major 408 approval, including hold harmless clause and commitment to accept operation and maintenance responsibility, and Section 104 eligibility
- Public comment period of NEPA document has closed
- Endangered Species Act consultation complete

- Safety Assurance Plan is approved and implemented
- Plans and specifications have been accepted
- Major 408 Summary Report has been completed
- Section 104 Federal credit memorandum

The District will submit the completed Major 408 information to the USACE Division Office. Division office will forward to the USACE Director of Civil Works (DCW) for review. The USACE-CW will grant approval of proposed alterations via letter to Division office. Division will endorse the letter to District Engineer and the Non-Federal Sponsor.

A summary of the recommendations and approvals is as follows:

- District certification of technical adequacy
- District recommendation for Major 408 approval
- Division/Regional recommendation for Major 408 approval
- HQUSACE approval of Major 408
- Division/Regional letter transmitting HQ approval
- District approval of NEPA ROD or FONSI
- District decision of Section 404 permit and/or Section 10 permit
- District issuance of Major 408 Letter of Permission
- Section 104 approval

**7.4 Minor 408.** Sufficient technical information of the proposed alteration must be submitted to the USACE for proper and timely evaluation. Coordination efforts between the District and the Non-Federal Sponsor will vary depending on the scope of the proposed alteration. Impacts of the proposed alteration to flood conveyance, structural integrity, operation and maintenance, and flood fighting capabilities must be presented. Construction plans and specifications must be submitted to the District as part of the technical data requirements. The proposed alteration will be evaluated for NEPA requirements. Refer to Attachment B for the Minor 408 submittal requirements.

A summary of the recommendations and approvals is as follows:

- District Decision Paper to Non-Federal Sponsor
- District issuance of Minor 408 letter of construction approval
- District decision of Section 404 permit and/or Section 10 permit (if applicable)

**7.5 Funding the Review Process.** Funding is necessary to support the USACE review process. The USACE has programs that support the review activities, which includes the Inspection of Completed Works (ICW) program. Project funds may be available if there is an ongoing funded project activity directly related to the review activities. In certain cases for proposed alterations necessary for Federal transportation projects, the USACE may accept and expend funds provided by a State Department of Transportation agency pursuant to Section 139(j) of Public Law 109-59 (codified at 33 USC 139(j)) provided the Secretary of Transportation finds such review activities directly and meaningfully contribute to an underlying transportation project. In such cases, the USACE may only accept funds in amounts necessary to permit the USACE to meet the time limits for environmental review established for the project and for activities beyond the normal and ordinary capabilities permitted by the USACE general appropriations.



Another funding source may be Section 214 of the Water Resources Act of 2000 (Public Law 106-541, authority extended till 2016 by Public Law 111-315). The Corp already had the authority to accept and expend funds for expediting Clean Water Act Section 404 (33 U.S.C. 1344) and/or Rivers and Harbors Act Section 10 (33 U.S.C. 403) permit applications in the Regulatory Program. In addition, it has been determined that it is appropriate to receive funding under that authority to expedite processing of permit application packages pursuant to 33 U.S.C. 408. Division or District Commanders will determine if accepting funds will expedite the processing of Section 408 permit applications for the funding entity, provided that the Division and/or the District put in place procedures for initial public notice actions as well as measures to ensure impartial evaluation and decision-making and provided that accepting these funds will not unduly delay completion of other work.

Section 104 is a crediting authority for features that have not yet been authorized by Congress. Alone, Section 104 requires technical review as well as documentation which describe the proposed advance work, the basis for concluding the plan is appropriate in relation to the Federal plan, the total cost and benefits, the environmental effects, and the urgency. A description of how the credit will be used is also required. When seeking Section 104 credit in conjunction with Major 408, the technical review is performed as part of the Major 408 and thus leaves only documentation to support the Section 104. This documentation is typically called the Federal Credit Memorandum.

- Sponsor requests Section 104 credit from the USACE
- Sponsor prepares Federal Credit Memorandum
- The District will transmit the Section 104 information with the Major 408 information.
- Section 104 approval is granted by the HQUSACE following Major 408 approval. USACE has 45 day minimum duration to approve credit.

**7.6 Schedule.** The processing time for the USACE Director of Civil Works Major 408 approval is different from the processing time for the District Engineer Minor 408 4 approval, due to the difference in the proposed alterations scope, required information, and review time. Early coordination with the District during the planning and design phases of the proposed alteration is strongly recommended to ensure the required information is developed in accordance with USACE standards and to reduce the length of review time.

**Major 408.** The estimated length of time for completion of the Major 408 process (from submittal by the Non-Federal Sponsor to the District, review, technical evaluation, submittal by District to Division and HQUSACE, and USACE Director of Civil Works approval) is 12 to 18 months, depending on the complexity of the proposed project. If required, a Section 404 and/or Section 10 permit must be obtained from the District Regulatory Branch. The timeline for completing a Section 404 and/or Section 10 permit will vary depending on the type of permit needed.

**Minor 408.** The estimated length of time for completion of the Minor 408 process, (from submittal by the Non-Federal Sponsor to District, review, technical evaluation, and District Engineer approval), is approximately 30 days per review depending on the complexity of the

proposed project. If required, a Section 404 and/or Section 10 permit must be obtained from the District Regulatory Branch. The timeline for completing a Section 404 permit and/or Section 10 permit will vary depending on the type of permit needed.

**7.7 Construction.** Construction guidance for the approved alteration is provided in SWFP 1150-2-1 Criteria for Construction Within the Limits of Existing Federal Flood Protection Projects - September 2003. Coordination of construction activities with the Non-Federal Sponsor is required before construction may begin.

**7.8 Summary.** All engineering analyses are performed by the Non-Federal Sponsor or project proponent. The District role is that of review and assurance the design is technically adequate and meets USACE standards.

## 8.0 Records and Measurements.

All records will be filed in accordance with ES-QMS140, "Records Management."

Type	Description	Location and/or Responsible Office	Record Media	Retention	Disposition
R	Alteration Request Package	LR	E	LR	LR
R	Decision Paper and Sponsor Letter	LR	E	LR	LR
M	Alteration Request Processing Time	LR	E	LR	LR

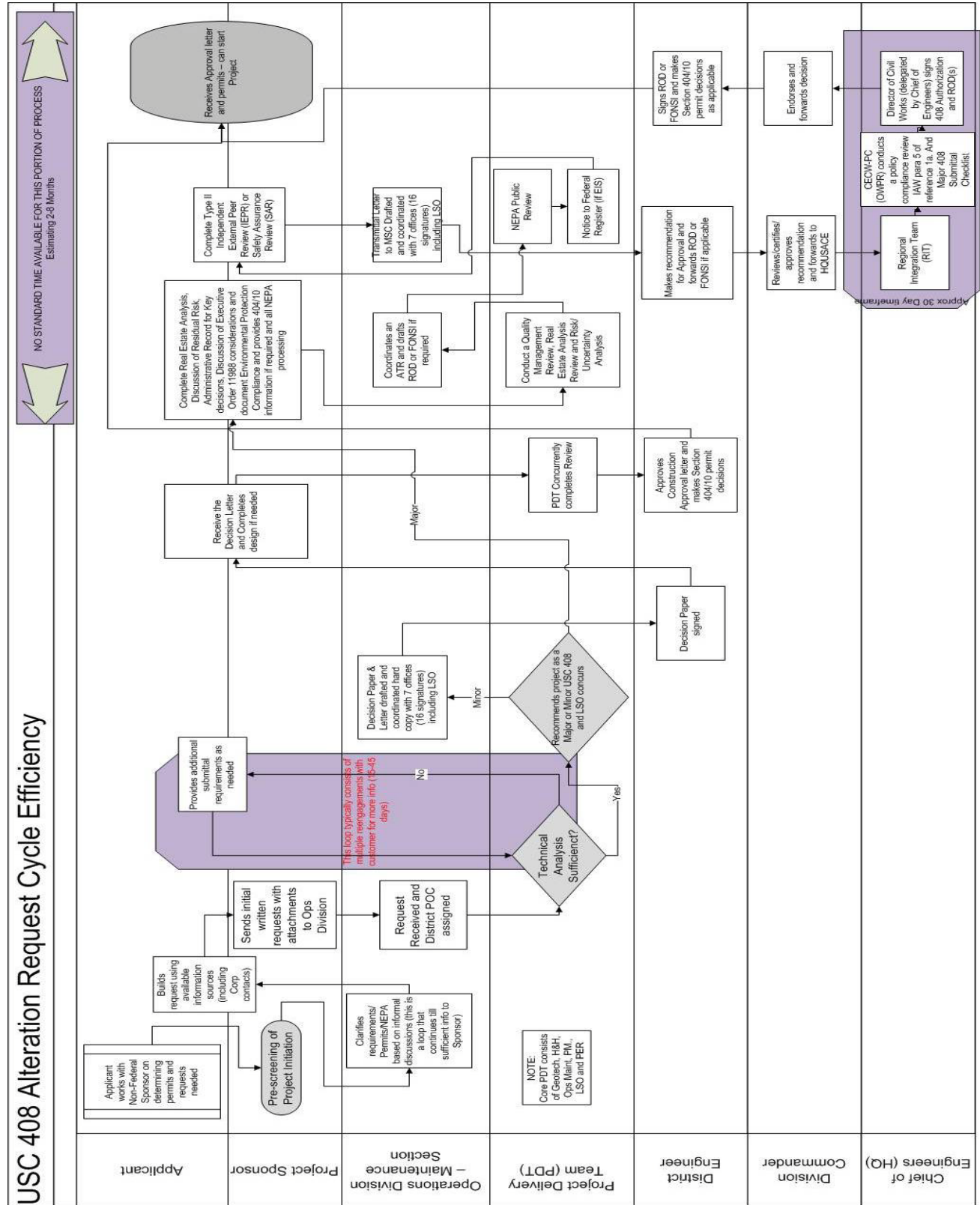
## Description of Terms

Type:	Location/Retention/Disposition	Record Media
R Record	LR Local Requirement	E Electronic
M Measurement		P Paper

## 9.0 Attachments.

Attachment A: Major 408 Project Submittal Requirements  
Attachment B: Minor 408 Project Submittal Requirements

## Flow Charts (internal processing and Customer Handout)

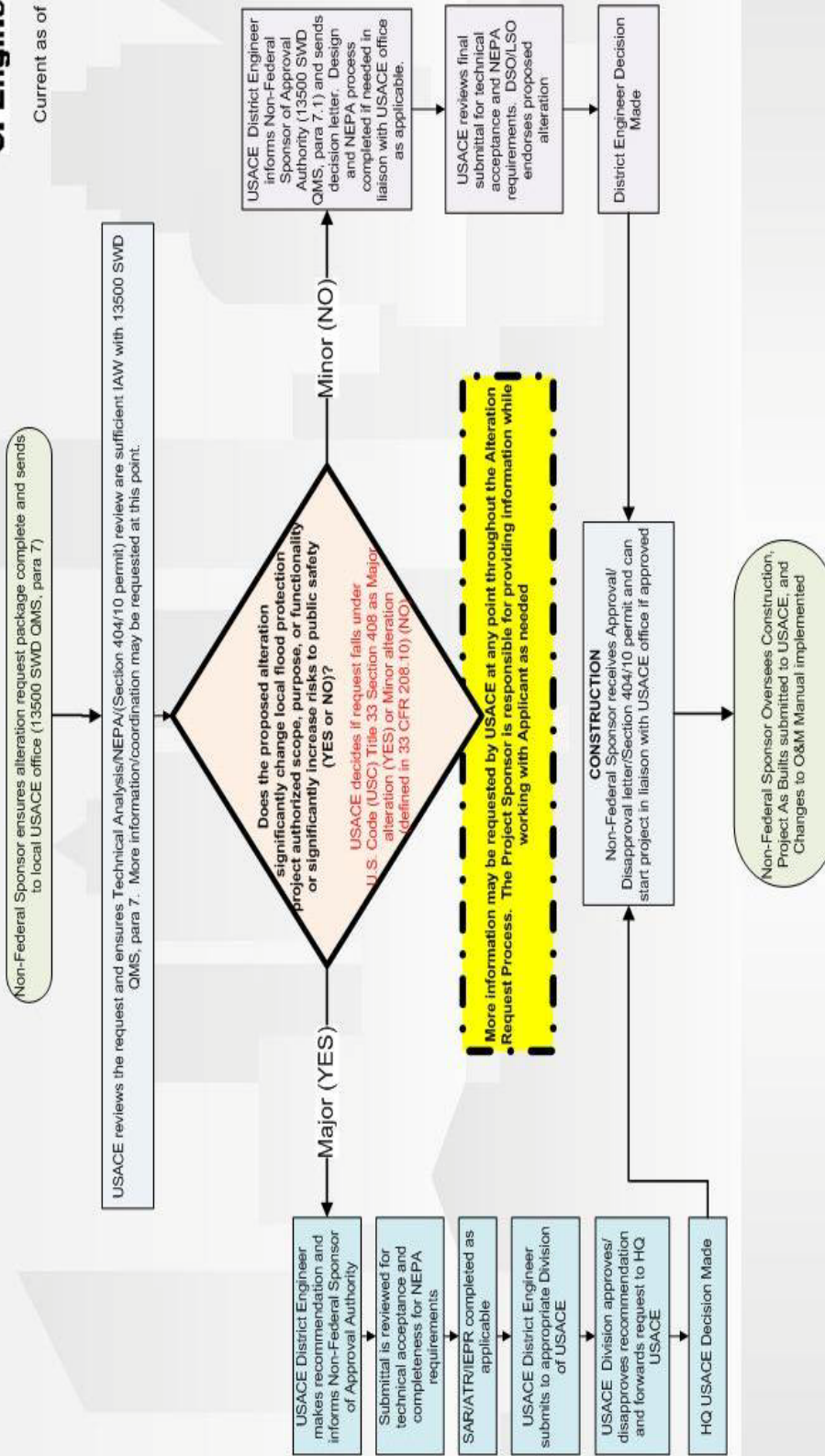



# U.S. Army Corp of Engineers (USACE) Project Alteration Request Process



**US Army Corps  
of Engineers®**

Current as of Nov 2010



 <p><b>US Army Corps of Engineers</b></p>	<p align="center"><b>13500.1 SWD QMS Attachment A Major 408 Project Submittal Requirements</b></p>	
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**1. Written request by the Non-Federal Sponsor to the District Engineer for approval of the project alteration.** The request shall include the following:

- A detailed description of the proposed alteration
- The purpose/need for the alteration
- A map indicating the location of the proposed alteration
- A description of the existing Federal local flood protection project

**2. A description of the ongoing, related USACE District studies in the watershed.**

**3. Technical Analysis and Adequacy of Design.** All necessary technical analysis must be provided. The list below includes items that are minimally expected in a submittal. The list is not intended to include every item that may be required. The list may also include items that are not required for a specific project. Technical requirements will be determined on a case-by-case basis and are unique to each proposal. Coordination with District will be necessary to determine the required items of the technical analysis.

a. Geotechnical

- Stability analysis
- Seepage/under seepage
- Erosion control
- Vegetation
- Material usage/borrow/waste/transport/hauling
- Compaction

b. Structural

- Bridges and abutments
- Pier penetrations of levee embankments
- Diaphragm walls
- Gates or other operable features
- Other structural components

c. Hydrology and Hydraulics

- Impacts to project design flood water surface profile

- Impacts to valley storage
- Downstream and upstream impacts
- Hydraulic model (if applicable)

d. Operation and Maintenance

- Impacts to operation and maintenance procedures

e. Construction

- Location of construction staging areas
- Emergency action plan for high water events

#### 4. Project Plans and Specifications

- Final set of Plans and Specifications

#### 5. Real Estate Analysis

a. Reference ER 405-1-12, Chapter 12, Sections I and II. Include:

- Description of all lands, easements, and rights-of-way required for the alteration, including proposed estates
- Description of all lands, easements, and rights-of-way owned as a part of the authorized project
- Maps clearly depicting required real estate and existing real estate limits
- Navigational servitude, facility relocations, relocation housing assistance, and any other relevant factors

**6. Administrative record** for key decisions for related actions for applicant's proposed alteration such as environmental reports, judges' decisions, permits, etc.

#### 7. Discussion of Executive Order 11988 Considerations.

**8. Discussion of Residual Risk.** Discuss the changes to the existing level of risk to life and property as a result of the alteration. Will the project incur damages more frequently as a result of flooding that will require Federal assistance under PL 84-99? Risk analysis will be used as the method for communicating residual risk. Non-Federal proposals should be evaluated for the potential impact of these changes, including system impacts, and must be evaluated in accordance with USACE regulations and policy. A risk analysis will be applied to all evaluations of proposals to USACE local flood protection projects in accordance with ER 1105-2-101 and shall apply to the following:

(a) Projects, whether with or without Federal funding, where an ongoing or proposed study considers alternative solutions,

(b) Where the proposed alterations/modifications may impact levees within the purview of forthcoming EC 1110-2- 6067 (formerly known as draft ETL 1110-2-570),



Certification of Levee Systems for the National Flood Insurance Program (NFIP) dated 30 September 2008.

(c) Alterations/modifications for which the non-Federal sponsor requests or intends to request credit either under Section 104 of WRDA 1986 (ER 1165-2-29) or Section 2003 of WRDA 2007.

Risk analysis is not required when evaluating the performance of an existing system where consideration of alternative solutions, USACE certification, or credit, is not involved. Even though ER 1105-2-101, Section 6, Variables in a Risk Analysis, includes geotechnical and structural analysis, the risk and uncertainty analysis for evaluation of potential system impacts is limited to the hydrologic and hydraulic parameters. Impacts will be determined by comparing performance parameters as presented in ER 1110-2-101 for the existing or base condition to the condition resulting from the project alteration. The base performance conditions are defined by authorized project features. USACE has provided technical guidance in EM 1110-2-1619, but has yet to fully develop the guidance needed to analyze risk and uncertainty for the geotechnical and structural performance of a system. Until such guidance is developed, deterministic procedures are appropriate for demonstrating geotechnical and structural integrity under the full range of loading conditions. For loading conditions where flood waters exceed the level of protection, the analysis shall include a breach analysis to assess impacts within the system. Under no circumstances will the analysis assume failure of any component of the levee or flood wall system for the flood up to the top of protection as a means to relieving systems impacts.

The District and the Non-Federal Sponsor shall work together to provide an appropriate assessment that incorporates state of the art analyses of other areas of uncertainty. Specific areas of concern include seismic stability, impacts of the overtopping loading conditions and potential impacts to interior drainage. Specific to seismic stability, the studies need to demonstrate that under normal operating conditions failure will not result in unexpected release of flows that would impact project performance.


**9. Environmental Protection Compliance.** All Major 408 actions must be in full compliance with all applicable Public laws, executive orders, rules and regulations, treaties, and other policy statements of the Federal government and all plans and constitutions, laws, directives, resolutions, gubernatorial directives, and other policy statements of States with jurisdiction in the planning area. Examples are State water and air quality regulations, State historic preservation plans, State lists of rare, threatened, or endangered species, and State comprehensive fish and wildlife management plans. The District will maintain full documentation of compliance as part of the administrative record. The submittal package provided to HQUSACE will document considerations with significant bearing on decisions regarding the Major 408 request. Typically the minimum submission will include the following:

- **National Environmental Policy Act (NEPA).** The appropriate NEPA process will be determined by the CESWF in consultation with agencies that regulate resources that may be affected by the proposed action. All resources listed in Section 122 of the Rivers and Harbors Act 1970 must be considered. The evaluation will include a description and analysis of project alternatives, the significance of the effects of each alternative on significant resources. Direct, indirect, and cumulative effects of all reasonably foreseeable actions including the actions of others and natural succession

must be considered and documented. A risk analysis must be completed to determine the significance of risks to human life and safety, and property. Mitigation plans must be well described. If Federal funds are or may be involved the mitigation plan must be incrementally justified. NEPA documents shall be consistent with 33 CFR 230.

- **Endangered Species Act (ESA).** Coordination/consultation with the U.S. Fish and Wildlife Service and/or NOAA Marine Fisheries Service must be complete. Each agency with jurisdiction over a species that may be affected by the proposed action must provide a letter/memo indicating completion of ESA coordination. This documentation may range from a memo saying no ESA protected species or habitats are in the project impact area through a Biological Opinion.
- **Fish and Wildlife Coordination Act (FWCA).** Either a Final FWCA Report or a letter from the USFWS stating that a FWCA Report is not required must be included.
- **Marine Protection, Research, and Sanctuaries Act (MPRSA).** For projects involving ocean disposal, or dredged material disposal within the territorial seas, the discharge will be evaluated under Section 103 of the MPRSA. The disposal must meet the criteria established by the EPA (40 CFR 227 and 228). The submittal will document that materials to be discharged are consistent with the current criteria and the disposal site is suitable.
- **Wild and Scenic Rivers Act.** The submittal will document efforts to identify designated rivers or river reaches (including potential rivers) in the vicinity of the project, and describe follow-up coordination with the agency having management responsibility for the particular river. If a designated river reach is affected, a letter indicating completed coordination is required from the managing agency.
- **Coastal Zone Management Act.** If the proposed action is in a coastal zone documentation of a “determination of consistency” with the state coastal zone management program the appropriate State agency (16 USC 1456) must be included.
- **Clean Air Act.** This is a two-part compliance process. First, the submittal must include a determination that the proposed action is consistent with the Implementation Plan of the affected jurisdiction(s), and concurrence of the appropriate regulatory agency, or a conditional permit. Second, the submittal must include a letter from the United States Environmental Protection Agency (USEPA) that they have reviewed and commented on the environmental impact evaluations including the NEPA documents.
- **Hazardous, Toxic, and Radioactive Waste (HTRW).** HTRW includes, but is not limited to, the Comprehensive Environmental Response, Compensation and Liability Act, the Resource Conservation and Recovery Act, and the Toxic Substances Control Act. The submittal package must include documentation that the USEPA and appropriate State and Tribal agencies with jurisdiction or expertise have been given reasonable opportunity to comment on the proposed action and that their input has been fully considered. The USACE shall incur no liability related to HTRW.

- **National Historic Preservation Act.** This includes all other applicable historic and cultural protection statutes. The submittal package will include documentation that the Advisory Council on Historic Preservation, and appropriate State and Tribal agencies with jurisdiction or expertise has been given a reasonable opportunity to comment on the proposed action and that their input has been fully considered. It is not expected that actual mitigation will be completed but appropriate letters indicating completed consultation determination of significance must be provided.
- **Noise Control Act.** Documentation of the significance of noise likely to be generated during construction of the proposed modification and the noise that may result due to implementation must be provided. If significant noise may result, a noise mitigation plan must be provided.
- **Clean Water Act Section 404 and Rivers and Harbors Act of 1899 Section 10 impacts, where applicable.**

 <p><b>US Army Corps of Engineers</b></p>	<p align="center"><b>13500.2 SWD QMS Attachment B Minor 408 Project Submittal Requirements</b></p>	
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**1. Written request by the Non-Federal Sponsor to the CESWF District Engineer for approval of the project alterations.** The request shall include the following:

- A detailed description of the proposed alteration
- The purpose/need for the alteration
- A map indicating the location of the proposed alteration

**2. Technical Analysis and Adequacy of Design.** All necessary technical analysis must be provided. The list below includes items that are minimally expected in a submittal. The list is not intended to include every item that may be required. The list may also include items that are not required for a specific project. Technical requirements will be determined on a case-by-case basis and are unique to each proposal. Coordination with CESWF will be necessary to determine the required items of the technical analysis.

a. Geotechnical

- Stability analysis
- Seepage/under seepage
- Erosion control
- Vegetation
- Material usage/borrow/waste/transport/hauling
- Compaction

b. Structural

- Bridges and abutments
- Pier penetrations of levee embankments
- Diaphragm walls
- Gates or other operable features
- Other structural components

c. Hydrology and Hydraulics

- Impacts to project design flood water surface profile
- Impacts to valley storage
- Downstream and upstream impacts
- Hydraulic model (if applicable)

d. Operation and Maintenance

- Impacts to operation and maintenance procedures

e. Construction

- Location of construction staging areas
- Emergency action plan for high water events

**3. NEPA (if applicable)**

**4. Project Plans and Specifications**

- Final set of Plans and Specifications

**Checklist of Common Items Required for Submittal of Encroachment Permit Application to  
Central Valley Flood Protection Board**

- A concise, accurate proposed project description
- Applicant's name; address; telephone #; FAX #; other relevant contact information
- Name and address of the proposed project owner
- County, section, township, range, and base meridian for the proposed project location
- Endorsement from district or local agency responsible for levee maintenance
- Pictures depicting various different views of the proposed project site
- Current list of names and addresses of all adjacent property owners
- Environmental questionnaire (DWR 3615a) filled out and submitted with application
- Maps, exhibits, plans and drawings depicting the proposed project
  - Location map showing the work site with relation to topographic features
  - Plan view
  - Adequate cross sections through the area of the proposed work
  - Plans must be drawn to scale and refer to NGVD29, or other known datum
  - Plans must indicate any project features such as levees and channels, roads, or other structures
  - Dimensions of any proposed or existing fills, excavations, and construction must also be given
- Name and address of Lead Agency for CEQA
- Four (4) copies of the application and all associated materials
  - Also provide electronic copies of the application and materials in a CD
- Geotechnical information/analysis
- Hydraulic information/analysis
- Seepage information/analysis
- The following Environmental Items (hard copy & electronic copy on CD):
  - Vegetation plan which includes: detailed design drawings; vegetation types, plant names (common & scientific); total numbers of each plant; plant spacing and irrigation method; all complying with Title 23, CCR Section 131. Include all plantings from the Dept. of Fish & Game Streambed Alteration Permit
  - Issued Dept. of Fish & Game Streambed Alteration Permit
  - Draft Environmental Impact Report (DEIR)
  - Final Environmental Impact Report (FEIR)
  - FEIR Notice of Determination per Title 14 CCR, Section 15094.



Appendix F – Minor 408 Memo

APPENDIX H

# **Approach and Milestones to Process the Minor 408 Permits**

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## Approach and Milestones to Process the Minor 408 Permits

**PREPARED FOR:** Mr. Michael Jewell, USACE, Chief Regulatory Division;  
Ms. Connell Dunning, EPA, Transportation Team Supervisor

**PREPARED BY:** CH2M HILL

**COPY TO:** Dan Leavitt/Authority; Jeff Abercrombie/Authority; Melissa DuMond/FRA;  
Ann Koby/PMT; Bryan Porter/PMT; Peter Valentine/PMT; Richard  
Wenzel/AECOM; Farid Nobari/CH2M HILL

**DATE:** November 7, 2011

### 1.1 SUMMARY

Due to the current preliminary phase of design development for the Merced to Fresno Section of the California High-Speed Train (HST) and the type of information necessary to support either a Major 408 Permit or Minor 408 Permit (Section 208.10/Encroachment Permit) application and approval, these application processes are premature. Also, the Minor 408 Permit may not be needed at this stage under Section 404, as there is no direct Section 404 requirement for a Minor 408, and such application would be out of sink with design phasing. The regulatory overview below may help clarify this.

Per the Memorandum of Understanding (October 2010) between the Federal Railroad Administration (FRA), California High-Speed Rail Authority (Authority), U.S. Environmental Protection Agency (EPA), and U.S. Army Corps of Engineers (USACE), necessary 408 Permit applications would be submitted with the Checkpoint C submittal. However, through ongoing coordination for the past 2 years with representatives of the Merced to Fresno Section consultant team, the USACE Sacramento District, and the Central Valley Flood Protection Board (CVFPB), the Merced to Fresno Section does not have crossings that would require a 408 Permit under USACE jurisdiction. There are jurisdictional flood control projects, but the project levees are generally not located at the HST alignment, and we anticipate that bridges and other types of crossings can be designed in such a way as to avoid adverse or unacceptable impacts to flood-control project conveyance and stability. This memorandum provides an overview of the regulations that manage crossings over waters of the U.S. with federal-state flood control projects. It also provides a set of milestones under which the Minor 408 (i.e., CVFPB Encroachment Permit satisfying Section 208.10 of Title 33 of the Code of Federal Regulations [33 CFR 208.10]) would be prepared once the project design sufficiently advances to support application and agency review.

### 1.2 BACKGROUND

Section 408 of Title 33 of the United States Code (33 U.S.C. 408) pertains to taking possession of, use of, or injury to harbor or river improvements and was originally codified as Section 10 of the Rivers and Harbors Act of 1899. Section 10 prohibits the unauthorized obstruction or alteration of any navigable water of the United States. The construction of any structure in or over any navigable water or work affecting the course, location, condition, or physical capacity of navigable waters is unlawful unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of the Army. The Secretary's approval authority has since been delegated to the USACE Chief of Engineers. The focus of

Section 408 is modifications to harbor and river improvements, and by definition it is administered at the level of the Chief of Engineers (USACE headquarters).

Section 208.10 of Title 33 of the Code of Federal Regulations (33 CFR 208.10) pertains to maintenance and operation of federal flood control projects and is therefore complementary to the broader Section 408, specifying requirements of local project sponsors to preserve and protect the authorized project. Section 208.10 was last updated by the Flood Control Act of 1944. The focus of Section 208.10 is minor changes to flood control projects where it can readily be confirmed that the authorized project is not materially modified, but rather that its operation or maintenance are preserved. Section 208.10 is administered and approved by USACE at the district level.

Although passed in 1899, it was not until 2006 that USACE first considered modifications under Section 408. Since then, USACE has issued a series of clarifying and sometimes contradictory guidance and struggled with inconsistent application. As an example of ongoing efforts to clarify the application of Section 408, much of it in the Central Valley of California, see the attached Congressional Briefing Paper (July 22, 2011). This paper uses the terms “Major 408” and “Minor 408.” It defines a Minor 408 as previous actions under Section 208.10, as well as more significant project modifications that go beyond operations and maintenance but that are intended to restore “the authorized level of protection or improving the structural integrity of the protection system” without changing “the authorized structural geometry or hydraulic capacity that were previously approved in accordance with Section 208.10.” Major 408s are degradations, raisings, realignments, and other alterations/modifications that go beyond a Minor 408.

In the Central Valley of California, USACE has delegated administration of Section 208.10 approvals to CVFPB via its encroachment permits but has retained its approval authority over the technical aspects of each encroachment project. CVFPB reviews encroachment permit applications for completeness and works with the applicant to ensure that all required application content is submitted.<sup>1,2</sup> Once the application is considered complete, CVFPB provides a copy of the application to USACE for concurrent review. In general, USACE focuses on technical engineering requirements, such as hydraulic modeling, geotechnical studies, and performance requirements, to fulfill its obligations under Section 408 and Section 208.10, while CVFPB focuses on environmental compliance and Title 23 standards to ensure compliance under the California Environmental Quality Act (CEQA) and Title 23 of the California Code of Regulations. USACE develops a list of requirements and restrictions (e.g., maximum rise criteria demonstrated through hydraulic modeling), which append the permit. CVFPB may also develop a list of requirements and restrictions for the permit and either issue the permit with requirements and restrictions or deny the permit based on its collaborative review with USACE.

The focus of the encroachment permit application is an environmental questionnaire to demonstrate conformance with CEQA requirements. Title 23 does not spell out technical engineering inputs for an encroachment permit, but they generally include the following, based on feedback from the USACE Sacramento District and CVFPB:

- Establish design hydrology; in some cases a new hydrology study may be needed to update older hydrologic information.
- Obtain field data for the crossing, such as cross-section surveys.
- Conduct a hydraulic analysis to determine the design water surface elevation and demonstrate minimal (generally less than 0.1 foot) incremental rise due to the project.

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<sup>1</sup> Taras, Curt. 2010. Chief of Floodway Encroachment and Enforcement, CVFPB. Personal communication regarding application reviews. April 21, 2010.

<sup>2</sup> Larson, Ryan. 2010. Section 208.10. USACE. Personal communication regarding application review. April 21, 2010.

- Demonstrate that the crossing design meets minimal requirements for setbacks, freeboard, and bridge clearance.
- Demonstrate adequacy with respect to scour and channel stability.

Portions of the above information have been developed for crossings scheduled for early construction, but the bulk of the crossing information needed for encroachment permits will be developed by the design-build contractor later in the project.

Table 1 provides an anticipated set of milestones through which these permits would be developed according to available information in the design phase. The current progress of the project does not provide the level of detail to prepare this permit during the Checkpoint C phase. Dependent on the phasing of the project, one or more crossing would be designed concurrently, following the same procedures.

**Table 1**  
Minor 408 Milestones

#	Task (in general order of work)	Anticipated design phase		
		15% on selected alternative (LEDPA)	30%	60%
1	Establish Design Hydrology (peak design flow rate): <ul style="list-style-type: none"> <li>• Collect, review, and summarize available hydrology</li> <li>• Consult with CVFPB and USACE</li> <li>• Develop original hydrology, if required</li> </ul>	X		
2	Obtain Existing Conditions Field Data (can start concurrent with Task 1): <ul style="list-style-type: none"> <li>• Aerial and field reconnaissance – field plans</li> <li>• Channel cross-section survey and processing</li> <li>• Geotechnical sampling, testing and data report</li> </ul>	X		
3	Establish Existing Conditions Hydraulics (HEC-RAS model) <ul style="list-style-type: none"> <li>• Develop HEC-RAS model for each crossing</li> <li>• Calibrate or validate the model</li> <li>• Consult with CVFPB and USACE</li> </ul>	X		
4	Demonstrate Minimal Hydraulic Impacts from Design (Confirm 208.10 vs. 408). Although some of this can be done on a preliminary basis using 15% design, 30% design will be required to support a Conditional Encroachment Permit application in Step 5. <ul style="list-style-type: none"> <li>• Incremental flood rise</li> <li>• Freeboard</li> <li>• Setbacks and levee clearance</li> <li>• Environmental questionnaire</li> <li>• Establish design water surface elevation and freeboard</li> <li>• Scour and channel stability</li> </ul>	X	X	

#	Task (in general order of work)	Anticipated design phase		
		15% on selected alternative (LEDPA)	30%	60%
5	Apply for Conditional Encroachment Permit: <ul style="list-style-type: none"> <li>Develop permit application:               <ul style="list-style-type: none"> <li>Landowner information</li> <li>Environmental questionnaire</li> <li>Design report with modeling appendices</li> </ul> </li> <li>Manage application process through completion               <ul style="list-style-type: none"> <li>CVFPB reviews for completeness</li> <li>Consultant response to request for completeness</li> <li>Concurrent CVFPB and USACE review of application</li> <li>Agency request for additional information or confirmation</li> <li>Consultant response to request for additional information or confirmation</li> <li>Issuance of Conditional Encroachment Permit</li> <li>Issuance of Minor 408 Compliance (no need for full 408 Permit)</li> </ul> </li> </ul>		X	
6	Verify Compliance with Conditional or Final Encroachment Permit (60% Design by Design-Builder)			X



ATTACHMENT

# **Congressional Briefing Paper Regarding Section 408 Review Process**

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**Proposed Framework for Guidance Clarifying the  
U.S. Army Corps of Engineers Section 408 Review Process  
for Locally Funded and Constructed Improvements  
to Federal Flood Control Projects**

**A. Introduction**

33 U.S.C. § 408 (Section 408) provides that any proposed modification to an existing U.S. Army Corps of Engineers (USACE) project must obtain permission from the Secretary of the Army by demonstrating that such proposed alteration or permanent use and occupation of the Federal flood control project is “not injurious to the public interest and will not impair the usefulness of such work.” USACE has historically exercised its review of modifications under 33 C.F.R. § 208.10 (Section 208.10). However, since 2006 USACE has considered some modifications directly under Section 408 and on June 18, 2010 the Director of Civil Works issued a memorandum stating that “from this date forward, [Section 408] will be the sole authority utilized for approvals to modify USACE projects.”

Since first considering modifications under Section 408 in 2006, USACE has provided ambiguous and occasionally contradictory guidance regarding Section 408. In some cases, this has caused substantial delay and increased costs for proposed critical improvements to Federal flood damage reduction projects necessary to reduce flood risk. In response, a coalition of non-Federal partners in California’s Central Valley worked with USACE to establish the Section 408 Task Force. The Task Force included a dialogue about creating a meaningful review process under Section 408 which balanced necessary review against delay and cost. Although that process did result in USACE developing guidance in late 2008 that addressed some concerns, other concerns were not addressed in the 2008 guidance or since. USACE is now updating its guidance for implementing Section 408, creating an opportunity for regulatory reform to address some of these concerns.

**B. Background**

On October 23, 2006, the Director of Civil Works issued a memorandum containing policy and procedural guidance for the approval of modifications and alterations to USACE projects (2006 Memorandum). The guidance provided that activities related to a non-Federal partner’s “responsibilities for operating and maintaining the structural soundness and functionality of projects in order to assure the project meets its authorized purpose” were specifically considered a part of the District Engineer’s responsibilities under Section 208.10. By contrast, proposed changes that exceed the “level of ordinary District O&M responsibilities” were subject to approval from Division and Headquarters (HQ) under Section 408. As noted above, the 408 Task Force worked with USACE in 2007 to define the applicability, scope, and requirements of the Section 408 process. A major outcome was that the Director of Civil Works issued clarification guidance on November 17, 2008 (2008 Clarification).

Despite the 2008 Clarification’s goal of providing “additional clarification” to supplement the 2006 Memorandum, the guidance has made reviews more time consuming and costly and created significant uncertainty within USACE and among non-Federal partners as to what approvals and what process is required to review and approve non-Federal partners’ improvements. For

example, the St. Louis District has recently indicated to the constituent members of the Southwestern Illinois Flood Prevention District Council that a system-wide Section 408 approval may be required despite the fact that the project merely restores the four locally maintained and operating portions of the levee system to a 100-year level of protection, which is less than the authorized 500-year level of protection. A second example is that in the Fort Worth District USACE has recently required non-Federal partners to complete a programmatic environmental assessment for current and future Section 408 requests without a legal requirement for such review. A further example arises from a June 22, 2011 memorandum from the Director of Civil Works which states that “until the potential cumulative effects of numerous levee alterations and related actions in the [California Central Valley] region are described in a programmatic NEPA document, we will be hesitant to approve additional 408 requests for alterations to Federal flood damage reduction projects.” The uncertainty surrounding these and other requirements for Section 408 approvals, the timelines associated with development of the required products, and – in some unfortunate cases – the timeliness of USACE review, has significantly impacted the time it will take for affected non-Federal partners to implement their locally funded projects designed to reduce flood risk. This delay is devastating not only to public safety, but also to attempts to use public works contracts to improve the economy.

USACE is currently drafting guidance entitled Approval of Alterations to Existing U.S. Army Corps of Engineers Public Works Projects, the January 20, 2011 draft of which was reviewed for this paper (Draft Guidance). Other summary-level proposed guidance was presented at the recent Levee Safety Program Workshop in Denver, Colorado on June 28, 2011 and this is providing an opportunity for USACE to again engage non-Federal partners in a public discussion about the process to approve local modifications to Federal flood damage reduction projects. This openness is commendable and should be expanded to provide meaningful interactive dialogue on Section 408 between USACE and all interested non-Federal partners.

### **C. Discussion**

There is no doubt that USACE review of non-Federal modifications to Federal flood damage reduction projects is a legitimate and proper oversight exercise by USACE; indeed, USACE has historically reviewed levee alterations and modifications at the District level under Section 208.10. But this legitimate oversight must be balanced against a review process which often operates on a case-by-case basis, which adds significant cost and delay to projects, and which rarely results in any substantive change to the project. Each procedure for implementing Section 408, and each additional level of review, must consider this delicate balancing act and the risk that unnecessarily intensive review may actually delay flood damage reduction projects or discourage non-Federal partners from pursuing such projects.

#### **1. Decisions regarding whether a Minor or Major 408 is required should be made by the District in the earliest reasonable stages of project.**

Current guidance states that a Major 408 review requires HQ involvement while a Minor 408 can be approved in the District. The Draft Guidance indicates that a Minor 408 review would typically be expected to take about 30 days, whereas a Major 408 review would typically take 12 to 18 months. Therefore, the label of Minor 408 or Major 408 is very important. The effort by a non-Federal partner to prepare the submittal package for a Major 408 review is also significantly

more lengthy and costly than a Minor 408 package, and USACE practice has required more costly and extended review of Major 408s under the National Environmental Policy Act (NEPA). Because USACE's technical expertise resides in the District, the Draft Guidance appropriately delegates to the District Engineer the initial decision as to whether a project requires Minor or Major 408 review. However, some Districts have indicated that review of whether a project is a Minor or Major 408 will only occur upon completion of 100% project design. This requirement subjects the proposed project to a potentially extensive and expensive review process where non-Federal partners have significant uncertainty until late in the process and minor design changes will delay the start of USACE review.

The District Engineer should make the determination as to whether a Minor or Major 408 review will be required at the earliest reasonable phases of the project. If the project's original scope changes, the District Engineer can revisit the previous determination. As a guiding principal, USACE HQ and Division should be involved in Section 408 review and approval only where necessary to assure consistency in application across Districts and where policy decisions need to be made. The case-by-case basis decision-making currently and proposed to be employed at HQ and Division has caused unnecessary expense and delay and created confusion as to the process required to obtain the proper level of approval.

## **2. Requests for crediting should be delinked from "Major" 408 review.**

The 2008 Clarification and the Draft Guidance both provide that only work approved as a Major 408 is creditable toward a future Federal project. Both sets of guidance inappropriately link all construction activities approved under a Minor 408 and Section 208.10 to operations and maintenance ("O&M"). In certain cases, this linkage is appropriate as credit should not be provided for O&M. But, for example, construction of seepage berms might be done to address defects in the original design and construction of a levee so as to restore "the authorized level of protection or [improve] the structural integrity of the protection system" and not as O&M. Such work may be creditable absent the Corp's guidance indicating otherwise. As a result, the current guidance is forcing non-Federal partners to go through the Major 408 approval process for work that would otherwise be approvable as a Minor 408 just to preserve the potential for work-in-kind credit. This perverse rule is an inefficient allocation of both local and Federal resources by requiring Division and HQ review. More importantly, it significantly delays flood damage reduction projects that would otherwise improve public safety and contribute to the economy.

## **3. USACE should adopt clearer guidance on what is a Major v. Minor 408 review.**

The current guidance has created significant doubt at the District level as to what is a "Major" versus "Minor" 408 project. The 2008 Clarification provides the following guidance:

- Minor 408s are (i) O&M activities that were previously approved in accordance with Section 208.10 or (ii) restoring the authorized level of protection or improving the structural integrity of the protection system that do not change the authorized structural geometry or hydraulic capacity that were previously approved in accordance with Section 208.10.

- Major 408s are degradations, raisings, and realignments and other alteration/modifications not approvable as a Minor 408.
- If it is unclear if a proposed change is within the authority of the District Engineer under Section 208.10, there must be an “engineering analysis” conducted with consideration of the full range of loading conditions to determine the impact of the proposed change on the systems performance. If the engineering analysis indicates system performance is adversely impacted then Major 408 review applies.

The confusion at the District level in applying these standards to specific projects has unnecessarily delayed project approvals. The Draft Guidance attempts to simplify the distinction between a Major and Minor 408 as follows:

A request for alteration to a public works project that consists of a significant change to the authorized project scope, project purpose, or functionality is defined as Major 408 and shall require approval by the USAC Director of Civil Works. . . .

But this does not adequately indicate what specific modifications would be considered a “significant change to the authorized project scope, project purpose, or functionality” and District Engineers must continue to rely on the inadequate 2008 Clarification to determine the scope of Section 408 review. In the absence of clearer guidance, many unnecessary reviews will be provided to Division and HQ, further delaying projects. Instead, USACE should clearly state that only levee raisings, extensions, realignments, and permanent degradations to the levee system should be subject to the Major 408 review process and that all other non-Federal partners’ projects (including proposed projects which restore the authorized level of protection without undertaking a raising, extension, realignment, or permanent degradation) should be reviewed at the District level, regardless of cost or credit requests. This is consistent with the USACE policy of requiring a higher level of review for projects that change the hydraulic performance of the flood protection system, as such projects may involve risk transfer.

In a related issue, the St. Louis District has taken the approach that despite significant project reaches being reviewable as a Minor 408, a Major 408 would be required for the entire levee system in the event any project reach met the criteria for such review. If the District requires consolidation of multiple projects under a single review, critical improvements that would otherwise be more quickly processed will be unnecessarily delayed. Well-crafted guidance would reduce uncertainty and only trigger a Major 408 where there is a compelling public interest for such scrutiny and additional levels of review and allow more easily approvable portions of the project to move forward quickly.

**4. USACE must ensure that proposed projects meet all necessary USACE design standards, but must limit that requirement to the limited area affected by the project.**

The Draft Guidance would require that USACE standards be met for any non-Federal partner’s project. While this may be a reasonable requirement for the geotechnical and structural evaluations of the proposed work, USACE may use this requirement to compel non-Federal partners to do additional work to meet USACE standards that are outside the scope and purpose

of the proposed work. For example, the communities protected by the Southwestern Illinois Flood Protection District intend to improve their levee systems so that they are not below the 100-year insurance standard set by the Federal Emergency Management Agency. However, USACE has been reviewing the design and plans in accordance with its ultimate goal of rehabilitating the levee system to a 500-year level of protection. This review is unnecessarily delaying the levee improvements and might eventually be used to compel non-Federal partners to comply with USACE plans, procedures, and policies that are unrelated to the priority work being submitted for approval and which would make the non-Federal partner's work significantly more expensive.

**5. USACE must adopt a fair “risk transfer” standard for 408 review which allows public safety projects to go forward.**

USACE has stated that projects that transfer significant risk (i.e., hydraulic impacts) to others, typically downstream flood protection systems, will not be approved under Section 408. This is a reasonable requirement. However, in order for this requirement to be applied fairly, the risk transfer standard applicable to a non-Federal partner's proposed work must be the same as that which USACE imposes on itself in its planning process. The standard that USACE applies to its own projects has historically considered impacts to property values and uses. Unfortunately, in implementing Section 408, USACE appears poised to hold non-Federal partners to a more rigorous standard than it applies to itself.

**6. USACE policy should allow the use of NEPA Categorical Exclusions; programmatic documents should not be required except where proposed by applicants or required by law.**

Non-Federal partners recognize that any proposed modifications to a Federal flood control work must be accomplished in compliance with NEPA and other applicable Federal and state environmental laws. The Draft Guidance recognizes this and provides that “[c]ompliance with NEPA and other applicable environmental laws and conducting of associated public/agency review is required for all Major Section 408 decisions.” USACE policy regarding NEPA compliance, however, should also include allowing the use of Categorical Exclusions for actions which do not individually or cumulatively have a significant impact on the human environment and which have been found to have no such effect. The Draft Guidance does not call for the District to evaluate particular projects with respect to applicable Categorical Exclusions which would save the non-Federal partner a significant amount of time and cost in going through the NEPA process. In particular, USACE should consider the application of the Categorical Exclusion it previously adopted in 33 C.F.R. § 230.9(b).

USACE has recently taken the position in California's Central Valley as well as in the Dallas-Forth Worth area that programmatic analysis are likely required prior to approving projects under Section 408, regardless of whether the projects can be approved as a Minor 408. Neither the law, existing guidance, nor the Draft Guidance requires a programmatic NEPA review. Importantly, USACE does not perform such a review for its own projects. While it is important to evaluate the environmental impacts of proposed modifications to Federal flood damage reduction projects, such an evaluation should be based on the needs of the individual project.



**7. USACE has the authority under Section 408 to approve levee raisings and extensions.**

USACE staff has stated it is considering whether proposed projects that would go beyond the currently authorized Federal project, such as levee raises and levee extensions, should be approved under Section 408, or should be deferred to Congress after further USACE study. This requirement of further study and deferring the decision to Congress would devastate local communities that otherwise have the funds and wherewithal to improve their levees. Such a limitation would also be inconsistent with USACE's past practice. This is especially troubling because several communities have been notified that river flow frequencies have changed and that flood protection systems will require significant modifications, such as raising and extensions, in order to be certified as meeting FEMA's 100-year flood insurance standard. The Draft Guidance should clarify that projects that are not injurious to the public interest and will not impair the usefulness of the Federal facilities are approvable under Section 408, including projects that exceed the scope of the authorized Federal project.

**D. Requested Actions**

Section 408 is a legitimate exercise of USACE's duty to ensure that modifications to its civil works projects are not injurious to the public interest and will not impair the usefulness of the Federal facilities. Given the current budgetary environment, it is unlikely that USACE will be able to undertake all necessary critical improvements to systems around the country in the near future. Therefore, non-Federal partners must take it upon themselves to fund reconstruction and improvements to reduce the current risk to public safety. Section 408 must not frustrate these efforts through layers of dilatory and inefficient review and rather must be a process used to ensure that the Federal flood damage reduction works will not be adversely impacted and the project will not injure the public.

Non-Federal partners seek to work with USACE to develop a sensible national policy on Section 408 approvals. USACE should engage these partners in an open and public discussion on the Draft Guidance and craft a principled approach which maximizes the number of projects classified as Minor 408, which allows projects which meet the criteria for a Minor 408 to receive speedy approval by the District Engineer, and which streamlines the review process for Major 408 projects to avoid delay to critical improvements necessary to reduce risk to flood-prone communities.

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Appendix G – PE4P Calculations for Dutch John Cut spans

## 5.0 Dutch John Crossing

The design team analyzed the two 350-foot span trusses over Dutch John. The analysis included the ten typical RC aerial spans before and after the truss crossings. The truss spans are formed using a steel truss structure with a curved top chord. The maximum depth of the truss superstructure is 57 feet at its center, with a total width of 40 feet 8 inches centerline to centerline. The aerial spans are formed using 10 feet 6 in deep precast, prestressed RC box girders that range in length from 100 feet to 120 feet.

### 5.1 General Description of Structure

The two steel trusses at the Dutch John Crossing are between Bents 33 and 35. The trusses both span 350 feet from bent to bent, with a maximum depth of 57-feet at the center and a minimum depth of 35 feet 6 inches from centerline to centerline. The truss is constructed of I-shaped and tube members. Bent 34, between the two trusses, is two 5-foot by 18-foot columns with a foundation of seven drilled shafts, 6 feet 6 inches in diameter, and a 10-foot deep pile cap. Bent 33 and 35, at the ends of trusses, are built from two 11-foot columns with foundations of six drilled shafts, 6 feet 6 inches in diameter, and a 10-foot deep pile cap.

The analysis of the Dutch John Crossing included the typical aerial spans from Bent 23 to 45, before and after the trusses. Typical spans consist of 100- to 120-foot-long precast and prestressed RC girders that are 10 feet 6 inches deep, with 13 feet between the top of rail and bottom of girders. Typical bents are hexagonal in shape with a diameter of 8 feet 0 inches. In order to ensure the constructability of the typical concrete column bent, columns were designed with a moderate amount of longitudinal reinforcement ratio, with  $\rho$  less than 1.5% and a moderate amount of transverse reinforcement, #8 bars @ 4" min spacing. The typical bent foundation consists of four drilled shafts, 6 feet 6 inches diameter and 100 feet deep, connected with a 9-foot-deep pile cap.

### 5.2 SAP and CSiBridge Models

The Dutch John Crossing was primarily analyzed using SAP2000 Version 15.1 (SAP). CSiBridge Version 15.2 (CSiBridge) was used to analyze the strength design of the steel truss with AASTHO design parameters. The models are similar in geometry and loading. Several different models were required in order to represent the different conditions of the structure at different loading cases and for different design checks per TM 2.10.4 and 2.10.10. Linear and nonlinear springs were used to represent boundary conditions and stiffness in the model. Per TM 2.10.10, upper and lower bound stiffness were taken into account. Upper and lower bound mass were also accounted for.

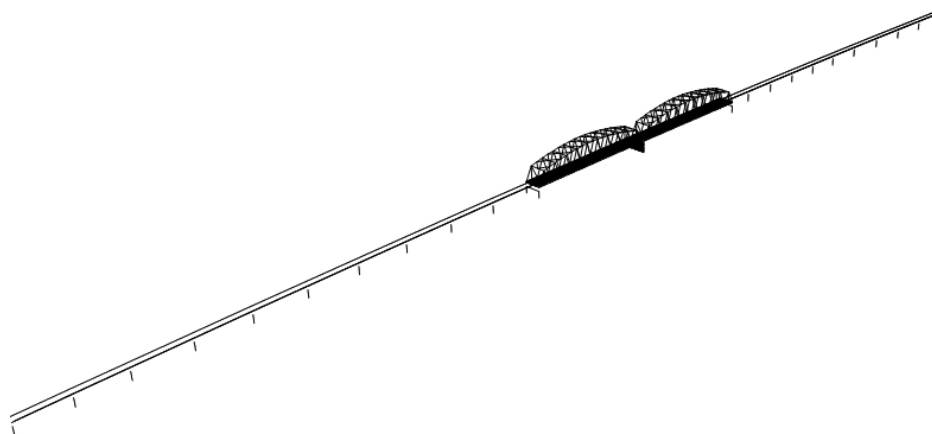
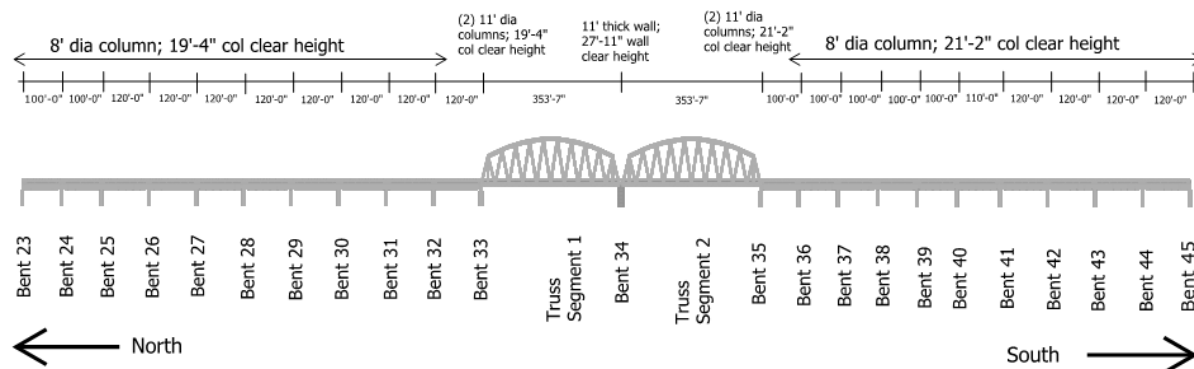


Figure 5.1-1

# SAP Model

The structural columns, truss members, rails and concrete girders were represented by stick elements (see Figure 5.1-1). The column clear heights and girder spans used in the model are noted in Figure 5.1-2. Note that a, average column clear height was used on each side of the trusses for simplicity. The typical column bent for the aerial spans was modeled as 8 feet in diameter. This is consistent with the standard aerial structure with clear heights less than 29 feet. Bents 33, 34 and 35 were designed with a double column geometry. The columns at the truss ends, Bents 33 and 35, were 40-feet apart and 11 feet in diameter. Bent 34, between the two truss spans, was designed as two 5-foot by 18-foot columns spaced 45-feet apart. Piles were represented by nonlinear springs connected with rigid links to model the pile cap. A six-pile geometry was used for Bents 33 and 35 and a seven-pile geometry was used for Bent 34. These bents all have a ten-foot deep pile cap.

Typical bent columns were designed with moderate longitudinal reinforcement,  $\rho$  of 1.5%, and moderate transverse reinforcement, #8 bars @ 4-inch spacing. The 11-foot columns at Bents 33 and 35 were designed with a minimum longitudinal reinforcement, with  $\rho$  of 1.2%, and moderate transverse reinforcement, #8 bars @ 4-inch spacing. The columns at Bent 34 were designed with two longitudinal layers of #11 bars at 12-inch spacing and #6 bars at 4-inch transverse reinforcement. Reinforcement may be refined in future design stages.



**Figure 5.1-2**  
Column and Span Geometry

Piles were analyzed in LPILE and Pilset for stiffness properties. All the piles were 6 feet 6 inches in diameter and 100 feet deep. The stiffness of each pile was modeled by nonlinear springs connected with rigid links to represent the pile cap. The stiffness of the typical four-pile layout was modeled by four nonlinear springs connected with rigid links to represent the pile cap. The same concept was used for the six-pile layout for Bents 33 and 35 and the seven-pile layout for Bent 34. Table 5.1-1 stiffness values of the pile.

**Table 5.1-1**  
Pile Stiffness Properties

Spring (Link) Name in SAP	Description	Vertical Axis Initial Stiffness (Non-Linear) (k/in)	Longit. Axis Initial Stiffness (Non-Linear) (k/in)	Transv. Axis Stiffness (Non-Linear) (k/in)	Rotation Around Vertical Axis Stiffness (Non-linear) (k-in/rad)	Rotation Around Longitud. Axis Stiffness (Non-linear) (k-in/rad)	Rotation Around Transv. Axis Stiffness (Non-linear) (k-in/rad)
Pile 6.5ft dia	(1) 6.5' x 100' Pile	4,839	1,445	1,445	N/A	28,073,722	28,073,722

The typical prestressed, precast concrete girders were 10 feet 6 inches deep with the top of rail 2 feet 6 inches above the top of concrete. The girders and maximum spans for this structure match the girders and associated maximum spans that were justified in the "Preliminary Design Report for 120-foot Double Track Standard Aerial Structure" calculations. The superstructure depth is therefore considered adequate for this design stage.

Truss geometry was based on the 15% Record set drawings. In the model, the height of the truss varied from 35 feet at the ends to 57 feet at mid-span when measured between centerlines of elements. The width of truss was set at 40 feet 8 inches between centerlines of elements. Each bay was approximately 35 feet long, and therefore the truss had ten bays of diagonals between bents.

Element sizes were modeled as follows:

- Interior Diagonals – Tube 3'x3'x2"
- Exterior Diagonals – Tube 3'x4'x4" (bay closest to bents)
- Exterior Diagonal Verticals – Tube 3'x4'x4" (bay closest to bents)
- Interior Top Chords– Tube 4'x3'x4"
- Exterior Top Chords– Tube 4'x3'x4" (two bays closest to bents)
- Interior Horizontal Beams at Top Chord – I 3'x3'x2"
- Exterior Horizontal Beams at Top Chord– Tube 4'x3'x4" (at bents)
- Top Chord Braces – I 12"x12"x0.75"
- Bottom Chords – Tube 4'x3'x2"
- Interior Horizontal Beams at Bottom Chord – I 3'x2'x2"
- Exterior Horizontal Beams at Bottom Chord– Tube 3'x3'x2" (bay closest to bents)
- Beams Parallel to Exterior Bottom Chords – Tube 3'x3'x2" (bay closest to bents)

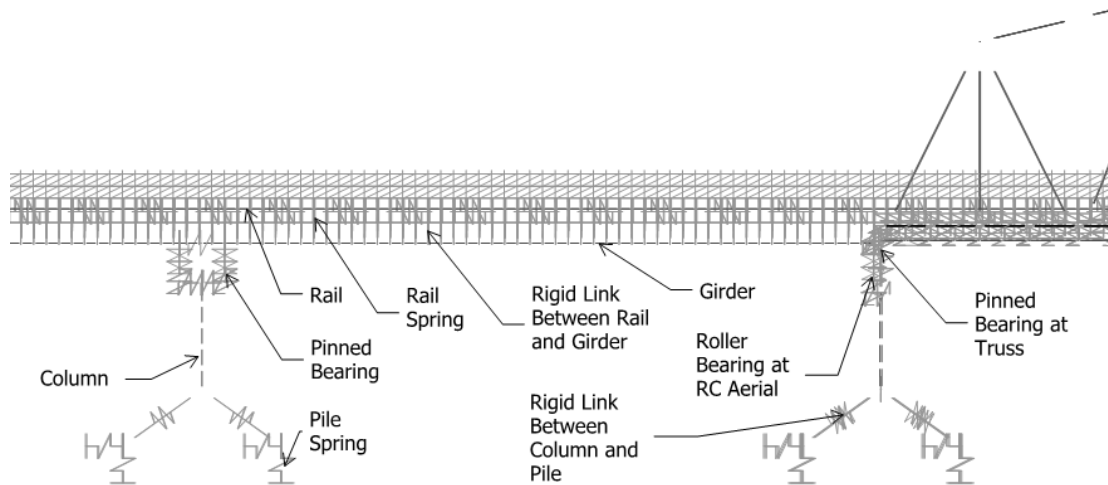
The steel modulus of elasticity was 29,000 ksi. The 1-foot deep deck slab was modeled using area elements on top of horizontal beams. A stiffness modifier of 0.2 was used in the longitudinal direction to account for cracking. The rail elements were connected to the slab and beam elements with clips at 27-inch spacing.

Girders were simply supported and connected to the bent caps with a linear roller-bearing spring on one side of the girder and a linear pinned-bearing spring on the other side. For Truss Span 1, a pin was placed on Bent 33 and a roller on Bent 34. For Truss Span 2, a pin was placed on Bent 34 and a roller on Bent 35. Roller and pin stiffness are noted in Table 5.1-2. See Figure 5.1-3 for the springs and members in the SAP model. In the unique case of the transverse frequency analysis, rigid restraints were added in place of the bearings, as only the flexibility of the superstructure needed to be considered.

**Table 5.1-2**  
Superstructure Bearing Boundary Conditions

Spring (Link) Name in SAP	Description	Vertical Axis Stiffness (Linear) (k/in)	Longitud. Axis Stiffness (Linear) (k/in)	Transv. Axis Stiffness (Linear) (k/in)	Rotation Around Vertical Axis Stiffness (Linear) (rad/in)	Rotation Around Longitud. Axis Stiffness (Linear) (rad/in)	Rotation Around Transv. Axis Stiffness (Linear) (rad/in)
Bearing Pin	Girder to Abutment Connection – Pin	16000	Fixed	Fixed	Free	Fixed	Free

Bearing Roller	Girder to Bent Connection – Roller	16000	Free	Fixed	Fixed	Fixed	Free
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**Figure 5.1-3**  
Members and Springs in the SAP Model

The two rails of each track were modeled as a single member. The section properties of 141RE AREMA rails were used. Rail section properties are shown in Table 5.1-3. Rails were connected to the structure via rail clip springs, as described in TM 2.10.10 Section 6.13.6. Clips occurred at 27 inches on center, and the nonlinear longitudinal stiffness differed for a loaded and unloaded case. For the frequency checks, all rails were considered unloaded. A nonlinear longitudinal spring with kinematic hysteretic properties and a yield point occurring at .02 inches was used. Vertical and transverse stiffness were linear. A clip at the end of the rail was used to represent the rail and fastener behavior past the end of the model extent, per TM 2.10.10 Section 6.13.7. See Table 5.1-4 for rail clip properties. See Figure 5.1-3 for the SAP model connections.

**Table 5.1-3**  
Rail Section Properties

Section Name	Description	Area (in <sup>2</sup> )	J (in <sup>4</sup> )	I <sub>major</sub> (in <sup>4</sup> )	I <sub>minor</sub> (in <sup>4</sup> )
141RE Rail	Typical rail section (2 rails)	27.6	10	201	22,070

**Table 5.1-4**  
Rail Clip Spring Properties

Spring (Link)	Description	Vertical Axis	Longitud. Axis Initial	Transv. Axis	Rotation Around	Rotation Around	Rotation Around
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Name in SAP		Stiffness (Linear) (k/in)	Stiffness (Nonlinear) (k/in)	Stiffness (Linear) (k/in)	Vertical Axis Boundary Condition	Longitud. Axis Boundary Condition	Transv. Axis Boundary Condition
Loaded Clip 27in	Rail Clip at 27" OC, Train Loading	750	270	84.375	Free	Fixed	Fixed
Unloaded Clip 27in	Rail Clip at 27" OC, No Train Loading	750	135	84.375	Free	Fixed	Fixed
Unloaded Clip Boundary	Rail Clip at Model Boundary for Rail Past Model Extent	2016	Free	Free	Free	Free	Free

For frequency checks, the models used (1) upper bound stiffness and lower bound mass or (2) lower bound stiffness and upper bound mass properties to envelope the results. For track serviceability and rail-structure interaction checks, the models used lower bound stiffness and upper bound mass for conservativeness. The bent strength checks used models with an upper bound stiffness and nominal mass to find the upper bound force demand. Bent deflection checks used models with a lower bound stiffness and upper bound mass to find the greatest deflection. All models used bents with 5,000 psi concrete column strength. In some of the models, where upper bound stiffness was used, the increase in stiffness was incorporated in the moment of inertia modifier rather than adjusting the 5,000 psi strength concrete's modulus of elasticity. A 1.3 factor increase in concrete strength is equivalent to a 1.14 (the square root of 1.3) factor increase in the modulus of elasticity. Since bent stiffness is a factor of both the modulus of elasticity and moment of inertia, the 1.14 factor was incorporated in the moment of inertia factor for simplicity. Bent effective moment of inertia, concrete modulus of elasticity, dead load mass percentage and the analysis type used for each check are shown in Table 5.1-5. Refer to Table 5.1-2 for pile stiffness values.

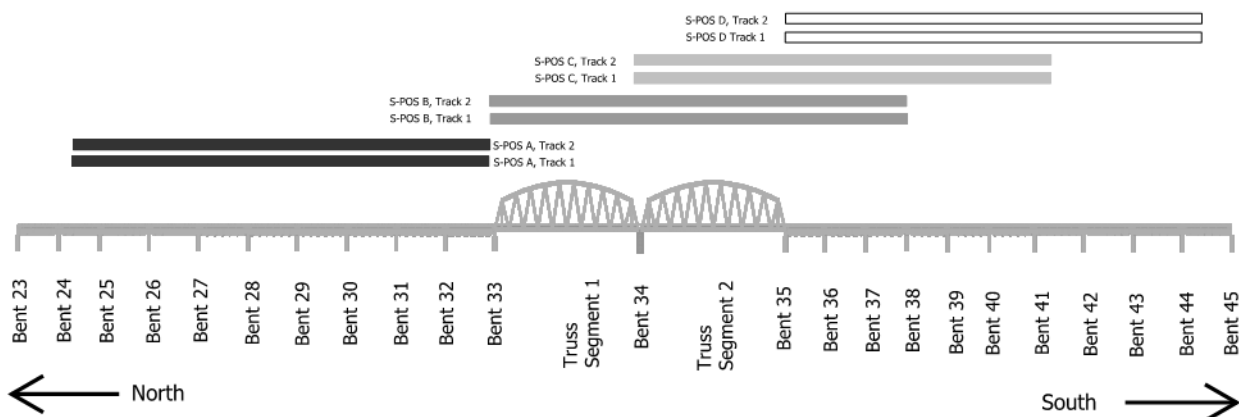


**Table 5.1-5**  
Model Properties for Stiffness, Mass, and Analysis Type

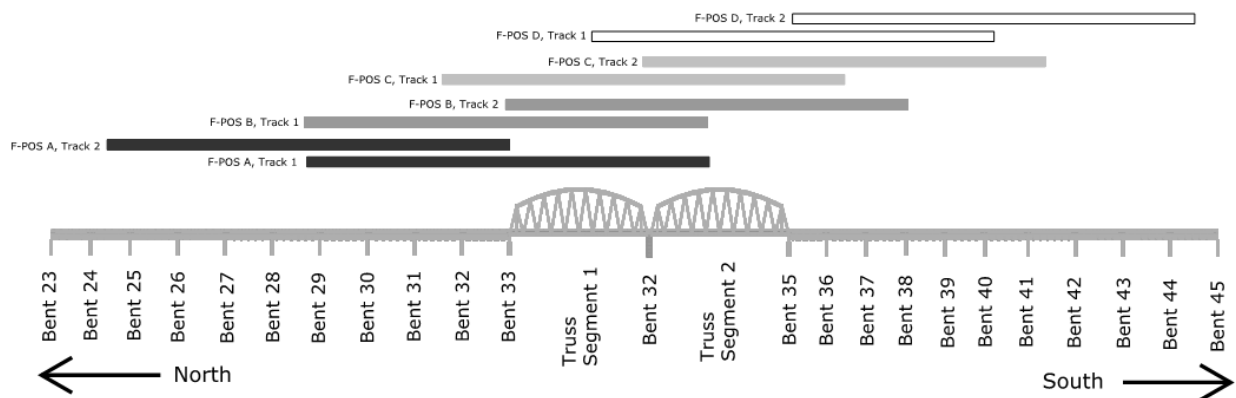
Model Title	Check	Description	Aerial Column/Truss End Column/Truss Center Columns Stiffness	Bent Concrete Strength (psi)	Equivalent Column Concrete Modulus of Elasticity (psi)	Dead Load Mass Percentage	Analysis Type
LOWER STIFF MAIN MODEL	Modal Frequency	Lower Bound Stiffness, Upper Bound Mass	$0.3/.4/.3 \times I_g$	5000	4,503,000	105%	Modal
UPPER STIFF FREQ	Modal Frequency	Lower Bound Stiffness, Upper Bound Mass	$I_g$	5000	5,134,000	95%	Modal
LOWER STIFF S-POS "X"	Track Serviceability and Rail Structure Interaction at Train Position "X"	Lower Bound Stiffness, Upper Bound Mass	$0.3/.4/.3 \times I_g$	5000	4,503,000	105%	Nonlinear Modal Time History
LOWER STIFF F-POS "X"	Seismic Deflection at Train Position "X"	Lower Bound Stiffness, Nominal Mass	$0.3/.4/.3 \times I_g$	5000	4,503,000	100%	Nonlinear Modal Time History; Nonlinear Pushover
UPPER STIFF F-POS "X"	Component Strength at Train Position "X"	Upper Bound Stiffness, Nominal Mass	$I_g$	5000	5,134,000	100%	Nonlinear Modal Time History

Train mass was included in the models for strength, deflection, track serviceability and rail-structure interaction checks. A train mass equivalent to 6.375 klf was applied for a single train at the center height of the train and corresponded to the live load position of the train on Track 1. Self-weight of the members and a 9.4 klf superimposed dead load on the girders and trusses were also used for mass in the model. Train live load was applied to the model in different locations to check displacements and forces at various train positions. These positions were chosen to produce maximum demand on the truss structure and its immediate supports. The load positions can be seen in Figures 5.1-4 and 5.1-5. Trains were assumed to be 1,000 feet long. The vertical live load was simplified to a uniform 6.375 klf live load on both tracks. Per TM 2.10.10, an impact load increase of between 20-22.5% was applied for track serviceability and rail-structure interaction checks, depending on the location of the load. A horizontal 1.35 klf braking force over 1,000 feet was applied to Track 2 and a horizontal 2.25 klf traction force over the 100 feet nearest to the governing column on Track 1 were also applied for these checks.

See Figures 5.1-4 and 5.1-5 for live load locations. A centrifugal force of .256 klf applied 6 feet above the rail was derived from a high speed train traveling at 250 mph with a track radius of 36,500 feet.



**Figure 5.1-4**  
Track Serviceability and Rail-Structure Interaction Check Live Load Positions, S-POS A to S-POS D



**Figure 5.1-5**  
Column Strength and Deflection Check Live Load Positions, S-POS A to S-POS D

### 5.3 Frequency Check

Per TM 2.10.10, the vertical, torsional and transverse frequencies of the structure must meet criteria to ensure serviceability of the train. SAP model "LOWER STIFF MAIN MODEL" checked vertical and torsional frequencies for Condition # 1 with upper bound mass and lower bound stiffness. SAP model "LOWER STIFF TRANSV FREQ" checked transverse frequency for Condition #1 and included only the flexibility of the superstructure per TM 2.10.10. SAP model "UPPER STIFF FREQ" checked vertical and torsional frequencies for Condition #2 with lower bound mass and upper bound stiffness. Frequencies for both conditions were within the set criteria. See Table 5.2-1 for a summary of the frequency criteria and results.

**Table 5.2-1**  
Frequency Check Results

	Vertical Frequency (Hz)	Torsional Frequency (Hz)	Transverse Frequency (Hz)
Lower Limit	1.47	N/A	1.2
Upper Limit	2.88	N/A	N/A
Lower Limit Condition 1	N/A	1.91	N/A
Lower Limit Condition 2	N/A	2.27	N/A
Condition 1	1.59	2.37	2.12
Condition 2	1.89	2.71	N/A

The vertical frequency limit was the most critical. This limit should be monitored throughout the design development to ensure that the structure maintains sufficient proportioning between the two natural frequencies.

## 5.4 Track Serviceability Check

Per TM2.10.10, girder deformations were checked for track serviceability with SAP models "LOWER STIFF S-POS A," "LOWER STIFF S-POS B," "LOWER STIFF S-POS C" and "LOWER STIFF S-POS D" that correspond to four different live load positions. Water loads were ignored for this design stage. Only the governing load cases of Group 1a ([LLRM + I]<sub>1</sub>), Group 1b ([LLRM + I]<sub>2</sub>), and Group 3 ([LLRM + I]<sub>1</sub> + OBE) were checked. Nonlinear Static Analysis was used to check non-seismic loads. In the Group 3 load case, results were superimposed with maximum seismic results from a Nonlinear Modal Time History Analysis. Deck twist was checked by measuring the deformation of "dummy links" along 10-foot lengths of the rails.

Deformations were found to be within rail serviceability limits.

See Tables 5.3-1 to 5.3-7 for results.

**Table 5.3-1**  
Track Serviceability Check – Group 1a Vertical Deflection

	Group 1a Vertical Deflection Check – Aerials with 120' Span (in)	Group 1a Vertical Deflection Check – Truss Span (in)	Group 1a Vertical Deflection Check – Aerials with 100' Span (in)
Upper Limit	0.41	2.64	0.34
S-POS A	0.26	0.01	0.0
S-POS B	0.03	0.74	0.16
S-POS C	0.0	0.76	0.16
S-POS D	0.0	0.01	0.15

**Table 5.3-2**  
Track Serviceability Check – Group 1b Vertical Deflection

	Group 1b Vertical Deflection Check – Aerials with 120' Span (in)	Group 1b Vertical Deflection Check – Truss Span (in)	Group 1b Vertical Deflection Check – Aerials with 100' Span (in)
Upper Limit	0.60	3.85	0.50
S-POS A	0.52	0.02	0.0
S-POS B	0.05	1.54	0.32
S-POS C	0.0	1.51	0.32
S-POS D	0.0	0.02	0.29

**Table 5.3-3**  
Track Serviceability Check – Group 1a and 1b Transverse Deflection

	Group 1a Transverse Deflection Check – Aerial Span (in)	Group 1a Transverse Deflection Check – Truss Span (in)	Group 1b Transverse Deflection Check – Aerial Span (in)	Group 1b Transverse Deflection Check – Truss Span (in)
Upper Limit	0.139	1.724	0.268	3.334
S-POS A	0.13	0.044	0.036	0.017
S-POS B	0.044	0.070	0.015	0.078
S-POS C	0.085	0.056	0.021	0.073
S-POS D	0.099	0.042	0.029	0.014

**Table 5.3-4**  
Track Serviceability Check – Group 3 Transverse Deflection

	Group 3 Transverse Deflection Check – Aerials with 120' Span (in)	Group 3 Transverse Deflection Check – Truss Span (in)	Group 3 Transverse Deflection Check – Aerials with 100' Span (in)
Upper Limit	0.624	5.387	0.434
S-POS A	0.251	0.459	0.056

S-POS B	0.092	0.643	0.119
S-POS C	0.090	0.603	0.170
S-POS D	0.090	0.477	0.164

**Table 5.3-5**

Track Serviceability Check – Rotation about Transverse Axis

	Group 1a Rotation about Transv. Axis Check (rad)	Group 1a Rotation about Transv. Axis Check (in)	Group 1b Rotation about Transv. Axis Check (rad)	Group 1b Rotation about Transv. Axis Check (in)	Group 3 Rotation about Transv. Axis Check (rad)	Group 3 Rotation about Transv. Axis Check (in)
Upper Limit	0.0012	0.330	0.0017	0.330	0.0026	0.67
S-POS A	0.00085	0.13244	0.00168	0.26224	0.0011	0.1730
S-POS B	0.00091	0.10635	0.00169	0.19773	0.0017	0.26458
S-POS C	0.00091	0.10659	0.00168	0.19656	0.0014	0.1679
S-POS D	0.00048	0.07472	0.00093	0.14508	0.0009	0.1455

**Table 5.3-6**

Track Serviceability Check – Rotation about Vertical Axis

	Group 1a Rotation about Vertical Axis Check (rad)	Group 1a Relative Displacement at Vertical Axis Check (in)	Group 1b Rotation about Vertical Axis Check (rad)	Group 1b Relative Displacement at Vertical Axis Check (in)	Group 3 Rotation about Vertical Axis Check – Max (rad)	Group 3 Relative Displacement at Vertical Axis Check – Max (in)
Upper Limit	0.0007	0.330	0.001	0.330	0.0021	0.670
S-POS A	0.00010	0.0141	0.00004	0.00518	0.00038	0.05486
S-POS B	0.00013	0.01858	0.00008	0.01080	0.00055	0.07906
S-POS C	0.00017	0.330	0.00008	0.01166	0.00061	0.08842
S-POS D	0.00011	0.01584	0.00004	0.00547	0.00046	0.06653

**Table 5.3-7**

Track Serviceability Check – Deck Twist Limits

	Group 1a Deck Twist Check (rad)	Group 1b Deck Twist Check (rad)	Group 3 Deck Twist Check (rad)
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Upper Limit	0.0012	0.0012	0.0034
S-POS A	0.00019	0.00005	0.00031
S-POS B	0.00026	0.00046	0.00041
S-POS C	0.00023	0.00037	0.00045
S-POS D	0.00017	0.00003	0.00028

## 5.5 Rail-Structure Interaction Check

Per TM2.10.10, rail deflection and stresses were checked for rail-structure interaction with the SAP models noted in the previous section. Water loads were ignored for this design stage. Group 4 ( $[LLRM + I]_2 + LF_2 \pm T_D$ ) and Group 5 ( $[LLRM + I]_1 + LF_2 \pm .5T_D + OBE$ ) load cases were checked. Nonlinear Static Analysis was used to check non-seismic loads. Results from Group 5 static loads were superimposed with the maximum results from the Nonlinear Modal Time History Seismic Analysis. Uplift values for direct fixation at fasteners are shown in Table 5.4-4. These values can be used to evaluate the acceptability of a fastener when a specific one is chosen in the future. Other rail-structure interaction checks met the criteria. See Tables 5.4-1 to 5.4-5 for all rail-structure interaction check results.

**Table 5.4-1**  
Rail-Structure Interaction Check – Relative Longitudinal Displacement at Expansion Joints

	Group 4 Relative Longitudinal Displacement at Expansion Joints – Aerial Bents (in)	Group 4 Relative Longitudinal Displacement at Expansion Joints – at Truss/Aerial Bent (in)	Group 4 Relative Longitudinal Displacement at Expansion Joints – at Truss Bent (in)	Group 5 Relative Longitudinal Displacement at Expansion Joints – Aerial Bents (in)	Group 5 Relative Longitudinal Displacement at Expansion Joints – at Truss Bent (in)
Upper Limit	1.288	1.694	2.100	2.474	2.880
S-POS A	0.364	0.985	1.018	0.764	0.859
S-POS B	0.387	1.301	1.302	0.882	0.883
S-POS C	0.359	1.324	0.978	0.925	0.706
S-POS D	0.339	0.982	0.966	0.727	0.797

**Table 5.4-2**  
Rail-Structure Interaction Check – Relative Vertical Displacement at Expansion Joints

	Group 4 Relative Vertical Displacement at Expansion Joints (in)	Group 5 Relative Vertical Displacement at Expansion Joints (in)

Upper Limit	0.25	0.5
S-POS A	0.075	0.201
S-POS B	0.043	0.164
S-POS C	0.047	0.173
S-POS D	0.051	0.159

**Table 5.4-3**

Rail-Structure Interaction Check – Relative Transverse Displacement at Expansion Joints

	Group 4 Relative Transverse Displacement at Expansion Joints (in)	Group 5 Relative Transverse Displacement at Expansion Joints (in)
Upper Limit	0.08	0.160
S-POS A	0.037	0.023
S-POS B	0.040	0.024
S-POS C	0.041	0.024
S-POS D	0.037	0.025

**Table 5.4-4**

Rail-Structure Interaction Check – Uplift at Direct Fixation Fasteners

	Group 4 Uplift at Direct Fixation Fasteners (k)	Group 5 Uplift at Direct Fixation Fasteners (k)
S-POS A	6	55
S-POS B	12	46
S-POS C	11	53
S-POS D	2	60

**Table 5.4-5**

Rail-Structure Interaction Check – Permissible Axial Rail Stress

	Group 4 Permissible Additional Axial Rail Stress (ksi)	Group 5 Permissible Additional Axial Rail Stress (ksi)
Limit	±14	±23
Maximum	9.82	20.33



Minimum	-9.42	-22.68
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## 5.6 Seismic Displacement Check

Per TM 2.10.4, this portion of the structure is considered an important, primary, and complex structure. Seismic displacements,  $\Delta_D$ , with MCE level seismic forces were checked with Nonlinear Modal Time History Analyses on SAP models "LOWER STIFF F-POS A" through "LOWER STIFF F-POS D." These deflections were compared to the resulting deflections in the global pushover model "LOWER STIFF GLOBAL PUSHOVER." Column displacements at yield,  $\Delta_Y$ , and collapse,  $\Delta_C$ , were determined with Nonlinear Pushover Analyses on "LOWER STIFF LOCAL PO" and "LOWER STIFF LOCAL PO FIXED." The structure performed at a No Collapse Level during an MCE strength earthquake and performed at an Operability Performance Level during an OBE strength earthquake. See Tables 5.5-1 through 5.5-3 for all seismic displacement check results.

**Table 5.5-1**  
Seismic Displacement Check – Displacement

	Transverse Collapse Upper Displacement Limit, $\Delta_C$ (in)	Transverse MCE Displacement, $\Delta_D$ (in)	Longitudinal Collapse Upper Displacement Limit, $\Delta_C$ (in)	Longitudinal MCE Displacement, $\Delta_D$ (in)
Bent 33 – East Column	5.03	0.53	4.98	1.52
Bent 33 – West Column	5.03	0.53	4.98	1.48
Bent 34 – 2 columns	12.54	1.40	5.68	1.52
Bent 35 – East Column	5.03	0.72	4.98	0.74
Bent 35 – West Column	5.03	0.72	4.98	0.75

**Table 5.5-2**  
Seismic Displacement Check – Displacement Demand Ductility Check

	Displacement Ductility Upper Limit	Transverse Yield Displacement $\Delta_Y$ (in)	Transverse Displacement Ductility, $\mu_D$	Longitudinal Yield Displacement $\Delta_Y$ (in)	Longitudinal Displacement Ductility, $\mu_D$
Bent 33 – East Column	5	2.45	0.21	1.91	0.79
Bent 33 – West	5	2.46	0.21	1.86	0.79

Column					
Bent 34 – 2 columns	5	2.46	0.57	1.86	0.81
Bent 35 – East Column	5	2.49	0.29	0.60	1.23
Bent 35 – West Column	5	2.50	0.29	0.60	1.25

**Table 5.5-3**  
Seismic Displacement Check – Capacity Ductility Check

	Capacity Ductility Lower Limit	Transverse Yield Column Displacement $\Delta_Y^{COL}$ (in)	Transverse Yield Column Displacement $\Delta_C^{COL}$ (in)	Transverse Capacity Ductility, $\mu_C$	Longitudinal Yield Column Displacement $\Delta_Y^{COL}$ (in)	Longitudinal Yield Column Displacement $\Delta_C^{COL}$ (in)	Longitudinal Capacity Ductility, $\mu_C$
Bent 33 & 35 Truss Column	3	0.178	1.7	9.55	0.17	1.78	10.47
Bent 34 2-Columns	3	1.36	11.37	8.34	0.75	4.45	5.09

## 5.7 Column Strength Check

Column strength checks used SAP models “UPPER STIFF F-POS A” through “UPPER STIFF F-POS D.” Per TM 2.3.2, Strength 1 combination ( $\gamma_P$  [DW, DC] + 1.75[LLV, LLRR]) and Strength 5 combinations ( $\gamma_P$  [DW, DC] +  $\gamma_{EQ}$  [LLV, LLRR] + 1.1 OBE) for both earthquake directions were considered. Water loads and frictional force were not investigated at this stage of the project and were not thought to contribute greatly to force demands. A flexural phi of 0.9 and shear phi of 0.75 were used for seismic cases. Flexural and axial capacities are interactive and individual load outputs for each column case were analyzed. The shear demand in each direction was enveloped to find the total shear demand. The V2 and V3 nomenclature in the results indicate axes in the longitudinal and transverse directions, respectively. The M2 and M3 nomenclature indicate the rotational axes in the corresponding direction. The moment and shear demands of the column were added together using the Square Root Sum of Squares (SRSS) method in order to compare to the moment and shear capacity in a single direction. All column strength criteria were met. Tables 5.6-1 to 5.6-3 show the governing results of the column strength checks. Tables 5.6-4 to 5.6-5 show the governing results of Bent 34 strength checks for the weak direction.

**Table 5.6-1**  
Column Strength Check – Strength 1 Load Case, Axial, and Flexural

	S-POS A Governing Column	S-POS B Governing Column	S-POS C Governing Column	S-POS D Governing Column
--	--------------------------------	--------------------------------	--------------------------------	--------------------------------

Axial Demand (k)	7,511	7,675	7,818	6,525
Moment M3 Demand (k-in)	267,218	291,721	137,254	81,468
Moment M2 Demand (k-in)	50,112	55,475	216,773	212,925
Moment M3 + M2 SRSS Demand (k-in)	271,876	296,949	256,572	227,989
Moment Capacity (k-in)	729,567	644,033	739,730	696,792
Demand/Capacity Ratio	0.37	0.46	0.35	0.33

**Table 5.6-2**

Column Strength Check – Strength 5 Load Case, Axial, and Flexural

	S-POS A Governing Column	S-POS B Governing Column	S-POS C Governing Column	S-POS D Governing Column
Axial Demand (k)	4,551	4,747	5,751	5,842
Moment M3 Demand (k-in)	370,307	377,599	339,513	348,434
Moment M2 Demand (k-in)	60,627	59,796	51,138	59,099
Moment M3 + M2 SRSS Demand (k-in)	375,238	382,305	343,342	353,410
Moment Capacity (k-in)	729,567	637,725	729,027	674,103
Demand/Capacity Ratio	0.51	0.60	0.47	0.52

**Table 5.6-3**

Column Strength Check – Strength 1 and 5 Load Case, Shear

	Envelope
Strength 1: Shear Demand (k)	1,773
Strength 5: Shear Demand (k)	911
$V_o^{col}$ , Shear Demand given Flexural Capacity (k)	3,302
Strength 5: Shear Capacity (k)	6,387

**Table 5.6-4**

Bent 34 Strength Check Weak Direction – Strength 1 and 5 Load Cases, Axial, and Flexural

	S-POS A	S-POS B	S-POS C	S-POS D
Strength 1 Governing Axial Demand (k-in)	21,426	26,335	24,719	21,438
Strength 1 Moment M3 Demand (k-in)	142,638	467,529	411,681	178,346
Strength 5 Governing Axial Demand (k-in)	16,818	18,135	17,386	16,798
Strength 5 Moment M3 Demand (k-in)	602,595	713,525	700,293	587,320
Axial Capacity Min (k)	122,000	122,000	122,000	122,000
Moment M3 Capacity (k-in)	2,124,000	2,124,000	2,124,000	2,124,000

**Table 5.6-5**

Bent 34 Strength Check Weak Direction – Strength 1 Load Case, Shear, and Shear Demand Given Flexural Capacity

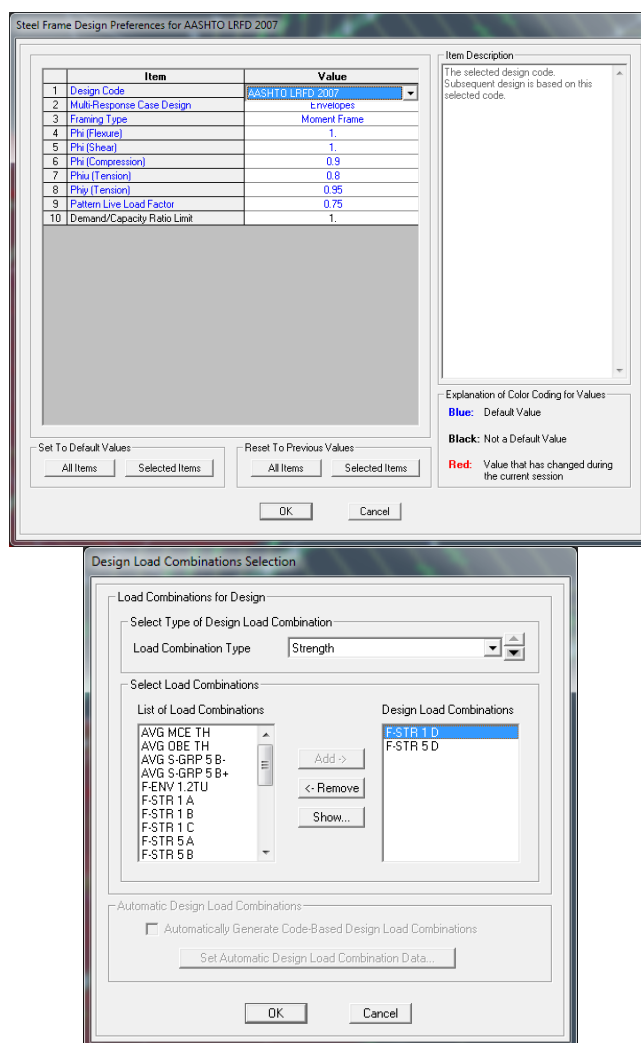
	Envelope
Strength 1: Shear Demand (k)	1,380
Strength 5: Shear Demand (k)	2160
$V_o^{col}$ , Shear Demand given Flexural Capacity (k)	4867
Shear Capacity (k)	10820

## 5.8 Steel Truss Strength Check

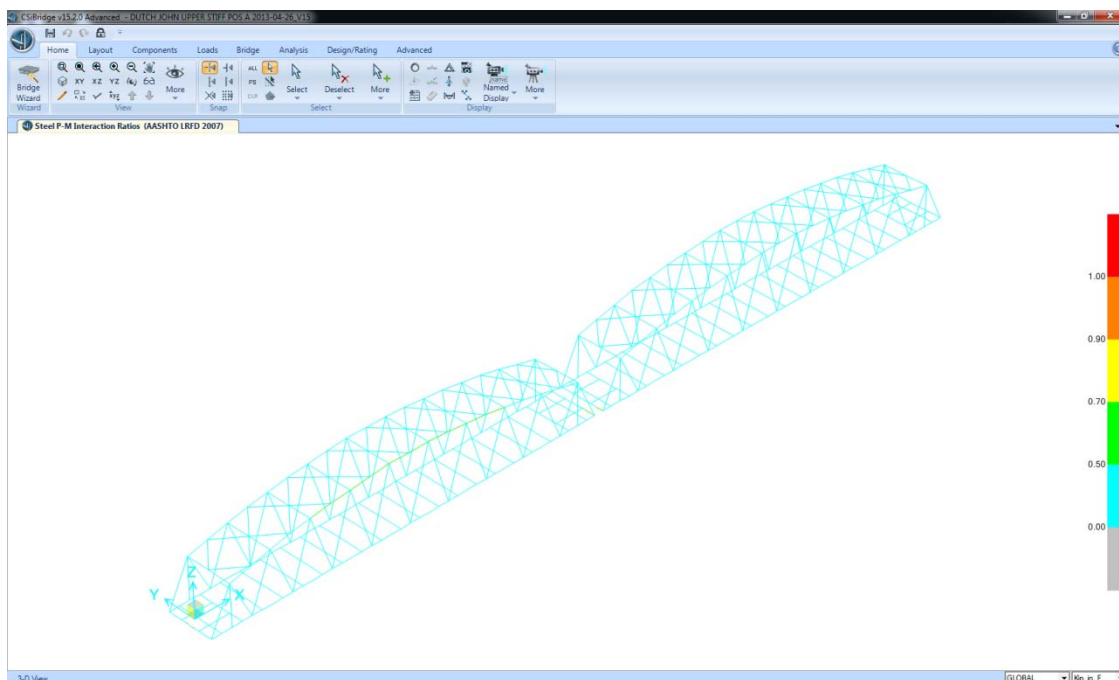
All steel truss members were checked by CSiBridge Steel Design to ensure elastic response under Strength 1 and Strength 5 load cases. CSiBridge checked the interaction of axial, shear and flexural forces and calculated the demand-to-capacity ratio for each member based upon the specified section and material properties and the relevant design code. The design code used in the check was AASHTO LRFD 2007, and other input parameters can be seen in Figure 5.7-1.

Figures 5.7-2 and 5.7-5 show results from loads of the four live load scenarios Positions A through D, with the demand-to-capacity ratios illustrated by a graded color designation. All steel members passed the check.

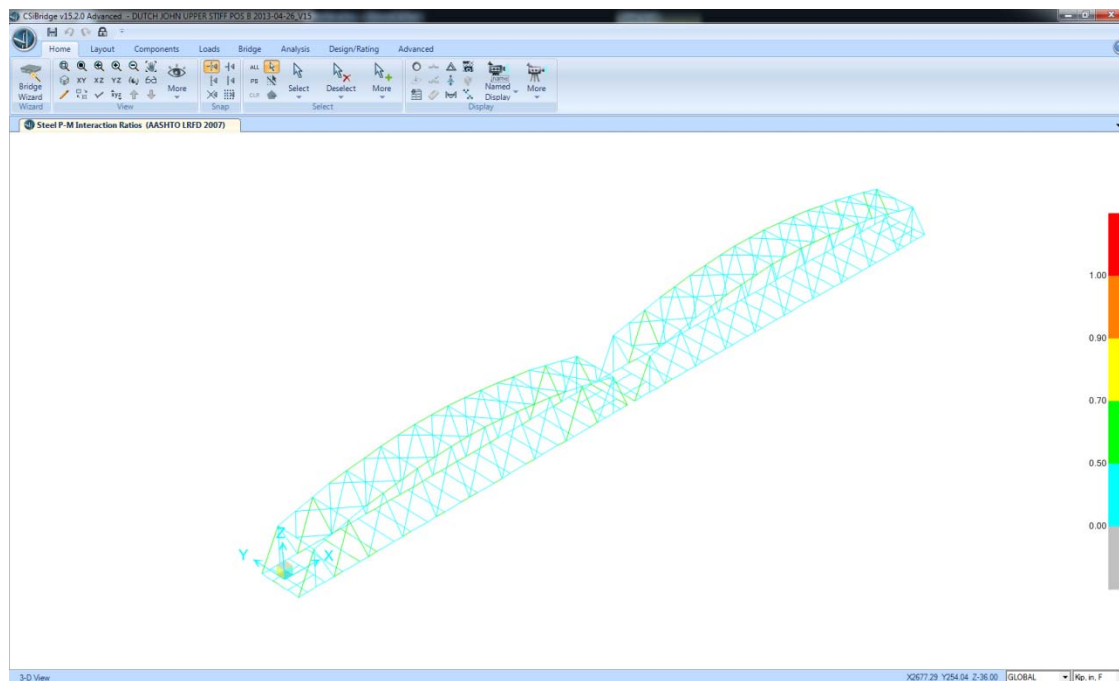
It is concluded that all critical steel members remained elastic under Strength 1 and Strength 5 (OBE Seismic) load cases.



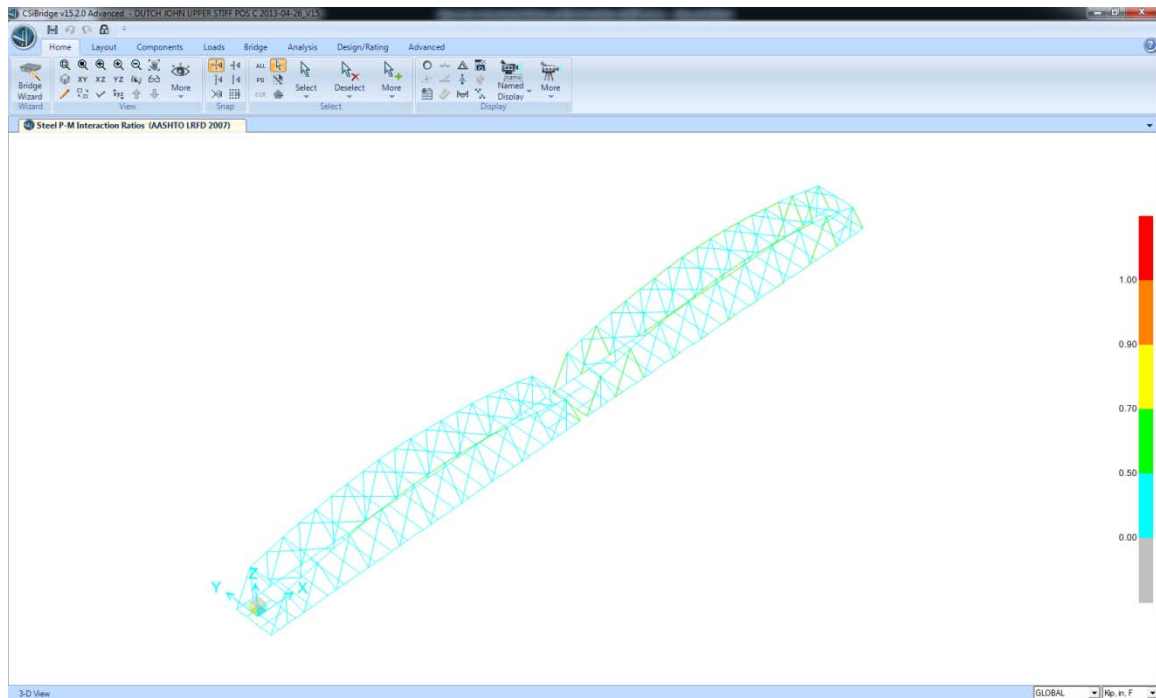
**Figure 5.7-1**  
Input Parameters for CSiBridge Steel Frame Design Check and Design



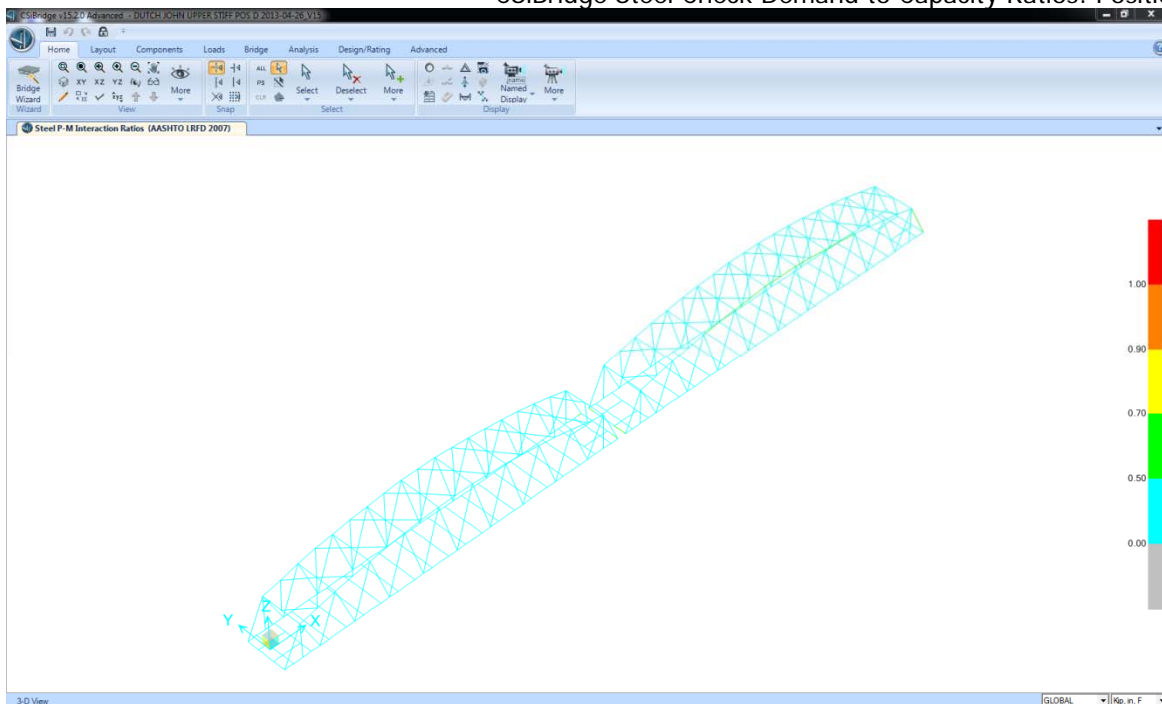
**Figure 5.7-2**  
CSiBridge Steel Check Demand to Capacity Ratios: Position A



**Figure 5.7-3**  
CSiBridge Steel Check Demand to Capacity Ratios: Position B



**Figure 5.7-4**  
CSiBridge Steel Check Demand to Capacity Ratios: Position C



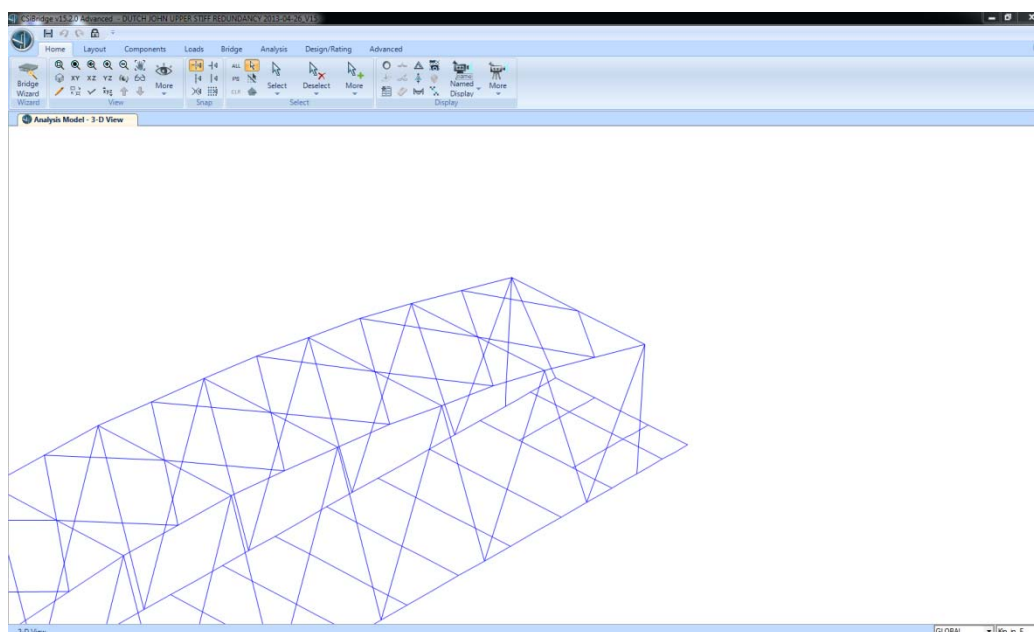
**Figure 5.7-5**  
CSiBridge Steel Check Demand to Capacity Ratios: Position D



## 5.9 “Loss of Member” Redundancy Check

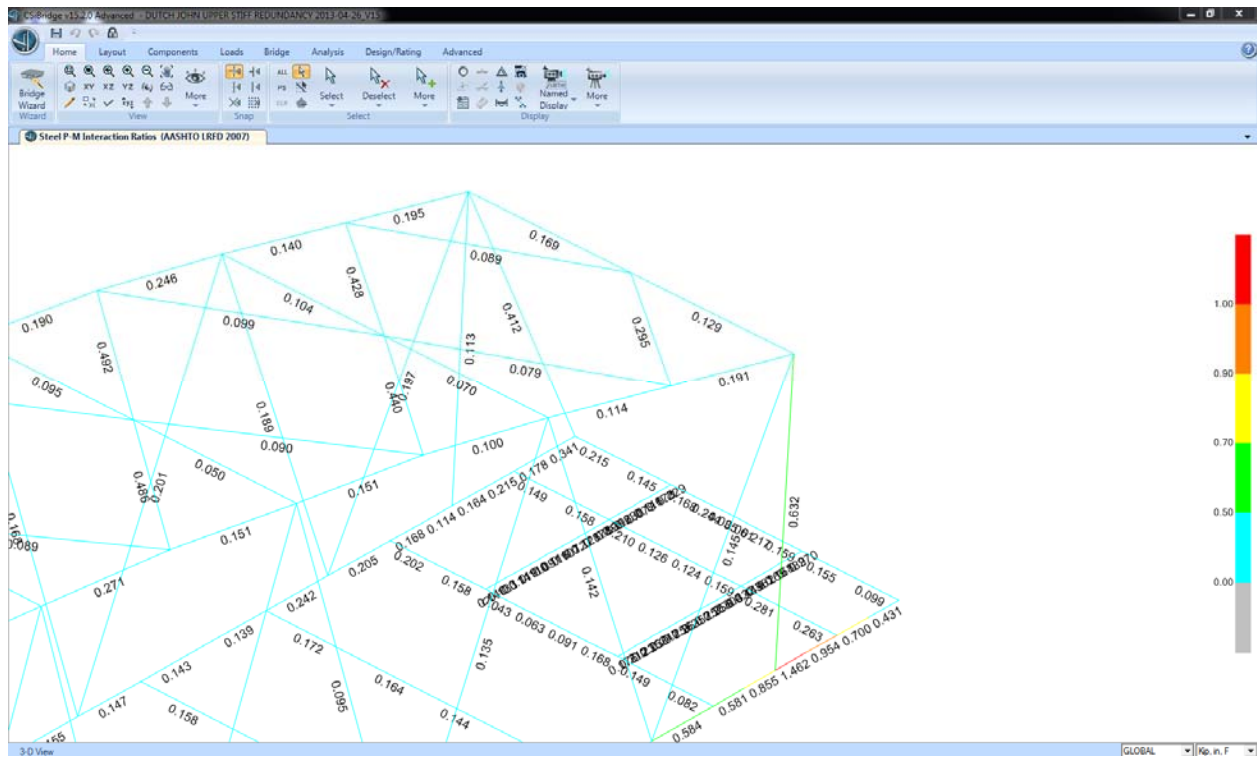
One case of a “loss of member” check was evaluated to ensure that the possible loss of one truss member would not cause progressive collapse of the structure. The outermost diagonal was removed, as this was the worst and most likely location for the loss of one member. See Figure 5.8-1. The utilized load case was based upon the Service 1 limit state, with 1.0 times dead load; however, live loads and associated impact loads were not considered. See Section 7 for further discussion on this approach and recommendations for design development.

The CSiBridge Steel Checking function was used to determine the member demand-to-capacity ratios per the AASHTO specifications. The critical members identified under this load case were the bottom chord members in the end bays. In the initial analysis, a small part of the bottom chord was shown to exceed elastic capacity with a demand-to-capacity ratio of 1.46 (see Figure 5.8-2). A further analysis was undertaken, whereby the section thicknesses was increased from 2” to 4.5” in the end chord members only, and the demand to capacity ratio was shown to fall within acceptable limits (see Figure 5.8-3). Note that this modification has a negligible impact on the corresponding structural and serviceability checks and should therefore be simple to refine in the development of the design.

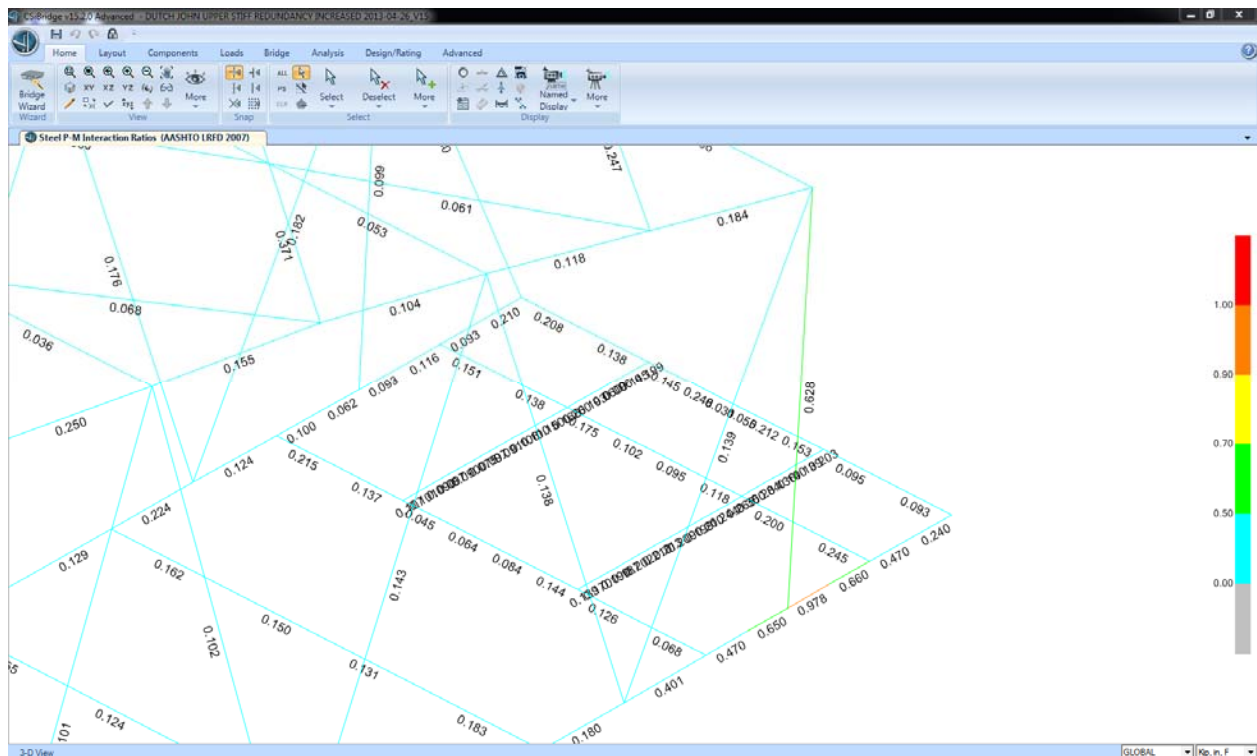


**Figure 5.8-1**  
Model with “Loss of Member” Check

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**Figure 5.8-2**  
Demand-to-Capacity Ratio of Steel Truss Members under "Loss of Member" Check, 2" Steel Thickness

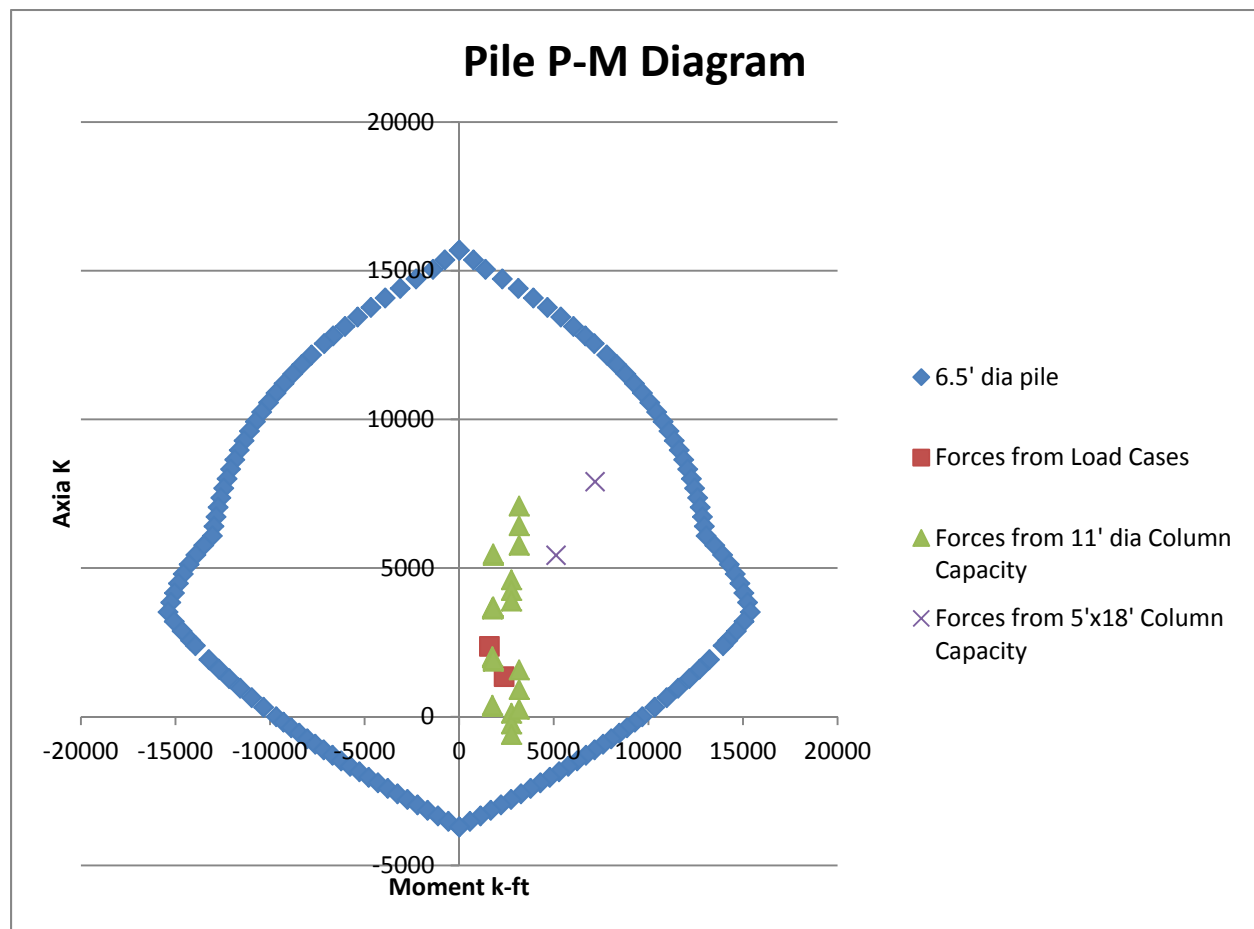


**Figure 5.8-3**  
Demand-to-Capacity Ratio of Steel Truss Members under "Loss of Member" Check – 4.5" Steel Thickness

## 5.10 Drilled Shaft Strength Check

In the SAP model, pile stiffness was represented with a nonlinear spring to account for the behavior of the surrounding soil, assuming a diameter of 6 feet 6 inches and a 100-foot long pile. The governing axial capacity is the minimal dead load because of the axial-moment diagram. The maximum moments from the Strength 1 and 5 load combinations were used with this axial case to find an enveloped demand case. A load case accounting for the plastic moment capacities of both column types was also considered. A minimal axial load and 1.2 times the plastic moment for the 11-foot column and 5-foot by 18-foot column in the longitudinal and transverse direction were applied.

An axial-moment diagram from the concrete analysis program spColumn was used to check the reinforcement design of the column. A minimal reinforcement ratio of 1.44% and #8 at 4-inch tie spacing was used. A graph showing the demand of minimal axial force with maximum flexural forces versus the capacity of the column is shown in Figure 5.9-1. Axial-moment interaction and shear forces were within pile capacities. Pile design may be refined in future design stages. A summary of the demand forces on the pile are shown in Tables 5.9-1 through 5.9-2. The M1 and M2 nomenclature in the results indicate rotational axes in the longitudinal and transverse directions, respectively. Moments in each direction were combined using the SRSS method.



**Figure 5.9-1**  
6' 6" Diameter Pile Axial-Moment Diagram with  $\rho=1.44\%$  and #8@4" ties

**Table 5.9-1**

Pile Strength Check – Strength 1 and 5 Load Case with Minimal Axial Load

	11' dia Column	5'x18' Column
<b>Governing Axial Demand (k)</b>	1350	2370
<b>Shear Demand (k)</b>	399	333
<b>Flexural Demand (k-ft)</b>	2375	1594

**Table 5.9-2**

Pile Strength Check – Moment Capacity Load Case

	Envelope at 11' dia Column – Transverse Direction	Envelope at 11' dia Column – Longitudinal Direction	Envelope at 5'x18' Column – Transverse Direction	Envelope at 5'x18' Column – Longitudinal Direction
<b>Governing Axial Demand (k)</b>	343	-597 (Tension)	5429	7906
<b>Shear Demand (k)</b>	2677	1518	577	810
<b>Flexural Demand (k-ft)</b>	17591	3164	5120	7180

## 5.11 Pile Cap Strength Check

The pile cap must transfer forces from the column into the piles. Per TM 2.10.4, the column's plastic moment with a 1.2 multiplier was used to find the demand on the pile cap. Moments at two axial cases were analyzed, at a minimal .9 times dead load and at the maximum axial load derived from all of the load combinations. A moderate amount of flexural reinforcing steel in the pile cap, two rows of #11 bars at 6 inches each way at the bottom and #11 bars at 6 inches each way at the top, was sufficient for demands. Vertical shear reinforcement of #6 bars at 10 inches for the 11-foot diameter column pile cap and #6 bars at 10 inches for 5-foot by 18-foot column pile cap were needed for shear and punching of the column and piles. Force demand and reinforcement may be refined in future design stages. See Table 5.10-1 for a summary of the results for the governing load cases of the column pile cap and wall pile cap.

**Table 5.10-1**  
Pile Cap Strength Check

	<b>Max Axial Combination – 11' dia Column Pile Cap</b>	<b>Max Axial Combination – 5' x 18' Column Pile Cap</b>
<b>Column Axial Demand (k)</b>	8289	21,438
<b>Column Axial Demand including Pile Cap Weight (k)</b>	22026	32,629
<b><math>M_o^{col}</math>, Flexural Demand (k-ft)</b>	84,606	212400
<b>Pile Axial Demand (k)</b>	19,278 for 3 piles	21,096
<b>Pile Flexural Demand (k-ft)</b>	9,106 for 3 piles	9000
<b>Max Moment Demand at Column Face per Foot (k-ft)</b>	2,624	3207
<b>Moment Capacity at Column Face per Foot (k-ft)</b>	3,279	3,268
<b>Max. Shear Demand, 'd' Away from Column per Foot (k)</b>	389	226
<b>Shear Capacity, 'd' Away from Column per Foot (k)</b>	480	481
<b>Max. Punching Shear Demand at Column (k)</b>	8,289	14716
<b>Punching Shear Capacity at Column (k)</b>	17268	60,876
<b>Max. Punching Shear Demand at Pile (k)</b>	6,246	4905
<b>Punching Shear Capacity at Pile (k)</b>	11,683	11,711

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# CALIFORNIA HIGH-SPEED RAIL PROGRAM DESIGN VARIANCE REQUEST



DVR NO: 0017 DVR TITLE: Substandard Maintenance Clearance

Prepared by: Liu Qiyu Firm: URS/HMM/Arup, a JV Company

## REVIEW

Supported by: Johnny Kuo Firm: PB

### PMT System-Level Review

Infrastructure	<input checked="" type="checkbox"/> Support DVR <input type="checkbox"/> Do Not Support	Railroad Systems	<input checked="" type="checkbox"/> Support DVR <input type="checkbox"/> Do Not Support
Operations & Maintenance	<input checked="" type="checkbox"/> Support DVR <input type="checkbox"/> Do Not Support	Rolling Stock	<input checked="" type="checkbox"/> Support DVR <input type="checkbox"/> Do Not Support
Systems Integration	<input checked="" type="checkbox"/> Support DVR <input type="checkbox"/> Do Not Support	Safety & Security	<input checked="" type="checkbox"/> Support DVR <input type="checkbox"/> Do Not Support
Engineering Manager	<input checked="" type="checkbox"/> Support DVR <input type="checkbox"/> Do Not Support	Criteria Classification:	

PMT Engineering Manager Recommendation: Recommend Acceptance. This variance was proposed as an alternative structure forms that would place a structural support within the BNSF's operational right of way. Recommended acceptance with following mitigations:

PCM DB Oversight Manager Recommendation:

N/A

CHSRA Engineering Mgr. Recommendation:

Recommend acceptance

DVR Committee Recommendation:

## APPROVAL

Authority action: ☒ Approve ☐ Reject

Name: Ofelia P. Alcantara Title: Director of Design & Construction

Signature: [Signature] Date: 9/30/14



**CHST DESIGN VARIANCE REQUEST FORM****Part 1 – Design Variance Request Information****Title/Subject: Substandard maintenance clearance at crossover structures.****Number: URS-INF-1-0017****Revision: 1****Contract Name & Number (Final Design): HSR 06-0003****Region: Fresno - Bakersfield****Location: Conejo Viaduct, Cross Creek Viaduct, Corcoran Viaduct****Regional Consultant's / Third Party Design Drawing Reference:** SV2223, SV2224, SV2469, SV2470, SV2493, SV2494, SV2495**Date Submitted to RMT & PMT**

PREPARED / SUBMITTED BY:

NAME: Qiyu Liu

COMPANY: URS/HMM/Arup A Joint Venture Company

SIGNATURE:

DATE: 05/02/14



(Engineering Seal)

\*Note design variance numbers will follow the same convention: "ABC" will abbreviate the name of the firm submitting the variance, "DEF" abbreviates the name of firm receiving the variance request, "X" is the revision number starting from 0, and the last four numbers count the number of total submittals starting from one.



## Part 2 – Design Variance Request Information

<b>CHSTP DESIGN REQUIREMENT</b> Include reference to drawings, design criteria, technical memos, specifications	The HSR Authority design standards require maintenance access to be provided around any foundation.
<b>DESIGN CRITERIA REQUIRING A VARIANCE</b>	TM 1.1.21 R1 dated August 19, 2013 Clause 3.3.1 requires 15 feet desirable clearance with 10 feet minimum to be provided around any foundation for future maintenance access.
<b>REASON FOR REQUESTING A VARIANCE</b>	<p>The crossover structures provide a clear span over the BNSF's operational right of way. In the absence of surveyed property boundary information (not due to be provided until late 2014) the BNSF ROW has been assumed to be an "Operational ROW" of 100-feet nominal width centered on the originally constructed track. The actual ROW is wider than this in some locations. The operational ROW is considered to be the width within which it is practically possible for the BNSF to construct a useable track alignment. Alternatively, the operational ROW assumed is the minimum width that would not restrict the BNSF's options for future track alignments.</p> <p>Work on the 15% record set design was commenced before issue of the current version of TM 1.1.21 R1 dated August 19, 2013.</p> <p>The foundation concept for the crossover structures is a single mono-pile shaft of 9ft diameter under each structure column of 6ft diameter. Typically this means that the piles are 3 to 5 feet from the BNSF ROW boundary.</p>
<b>JUSTIFICATION FOR VARIANCE</b>	<p>The analysis of the crossover structures has shown that the natural period of these structures is very close to the minimum frequency limits of TM 2.10.10 such that to increase the span to provide maintenance access clearance to foundations between the foundation and the BNSF ROW boundary would be likely to compromise the frequency limits.</p> <p>In some locations the SR 43 runs parallel to the BNSF corridor and so the crossover structure has a second line of columns located adjacent within</p>

	<p>the Caltrans ROW. In these locations, providing the required maintenance clearance to the BNSF ROW would further compromise the Caltrans ROW.</p> <p>Discussions with both the BNSF and Caltrans regarding this and other issues are just commencing and so there is, to date, no clear indication of the acceptability of the structural proposal to each party.</p>
<b>PROPOSED ALTERNATIVE DESIGN REQUIREMENT</b>	<p>To provide maintenance access to the foundations in accordance with TM 1.1.21 it would be necessary to increase the span of the crossover structure.</p> <p>A span increase has several consequences:</p> <ul style="list-style-type: none"> <li>• Due to the high skew of the crossing, every extra foot of span will increase the length of the crossover structure by approx. 10 feet (this varies because each crossover has a different skew angle to the BNSF);</li> <li>• As the span increases, it becomes more difficult to satisfy the frequency limits of TM 2.10.10. The current design achieves a reasonably economic design that is close to the lower frequency limit.;</li> <li>• As the span increases, the depth of precast beam required for the deck slab increases. There is a small margin within the vertical clearance dimension which will allow for a small increase in the beam depth. Further increases in depth would require changes to the track alignment;</li> <li>• Additional ROW would need to be acquired to accommodate the increased size of the crossover structure. This would also increase the environmental footprint;</li> <li>• Overall, the above changes increase the cost of the structure.</li> </ul> <p>Alternatively, the structure form could be changed to straddle bents and standard girder spans. This would be likely to require a change in the vertical alignment of the tracks.</p> <p>Alternatively, maintenance access to the foundations of the crossovers would be possible by</p>

	entering the BNSF and/or Caltrans ROW. This would require a permanent easement to be negotiated with BNSF.
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### Part 3 – Impact Analysis

<b>OPERATIONS</b>	<p>It would be possible for the Authority to carry out routine inspections of the structure from the outside provided that there is no requirement to get within hands length of all surfaces. The Caltrans ROW is assumed to be publicly accessible (although safety equipment may be required for operatives undertaking the work, no traffic control is assumed).</p> <p>Limited access to the foundations is not expected to impact the operation of the HSR.</p>
<b>MAINTENANCE</b>	<p>There is no change to the maintenance requirements of the structure, that is, the structure requires periodic inspection and occasional minor repairs. The accessibility of the foundations is not likely to affect these requirements as it is not normal to expose foundations for inspection or even routine maintenance.</p> <p>Should the structure require a seismic upgrade in the future (i.e. Not a normal maintenance operation), access for foundation strengthening works would, of necessity, need to be provided from within the BNSF or Caltrans ROW in addition to the HSR ROW.</p> <p>Inspection of the soffit of the structure will require the negotiation of an access easement with the BNSF in any case as the structural deck is above their ROW and so will be inaccessible by any other means.</p>
<b>INFRASTRUCTURE</b>	The effects on the infrastructure of the HSR are expected to be negligible.
<b>RAILROAD SYSTEMS</b>	BNSF are likely to require the presence of a flagman for the duration of any access
<b>RELIABILITY / FUNCTIONALITY</b>	The proposed change is not expected to have any effect on reliability of the system, nor on its

	functionality.
<b>THIRD PARTY (Utility, Freight, Caltrans, RR, other)</b>	<p>An easement would need to be negotiated with the BNSF and possibly Caltrans to allow entry to their ROW for maintenance and inspection purposes.</p> <p>BNSF are likely to require the presence of a flagman for the duration of any access</p>
<b>SAFETY AND SECURITY</b>	<p>BNSF are likely to require the presence of a flagman for the duration of any access.</p> <p>At present the proposed structure column faces will typically be 4.5 to 6.5-feet from the BNSF ROW. As the BNSF ROW is assumed to be centered on the original track this means that the face of columns will be typically be a minimum of 29.5-feet and up to 54.5-feet from the nearest track centerline. Column protection will not be required for these clearances.</p>
<b>DIRECT COST</b>	<p>The crossover structures are significantly more costly per mile than the standard viaduct.</p> <p>Because of the high skew angles of these crossings these structures tend to be very long, between 1000 feet and 2500 feet.</p> <p>The alternative to this Design Variance would be to widen the structure by between 20 and 30 feet over the full length of the crossover section. Any increase in width would also be likely to require the superstructure to be deepened.</p> <p>Taken together, this Design Variance would allow the crossover structures to be constructed at a more reasonable cost.</p>
<b>OTHER</b>	None identified

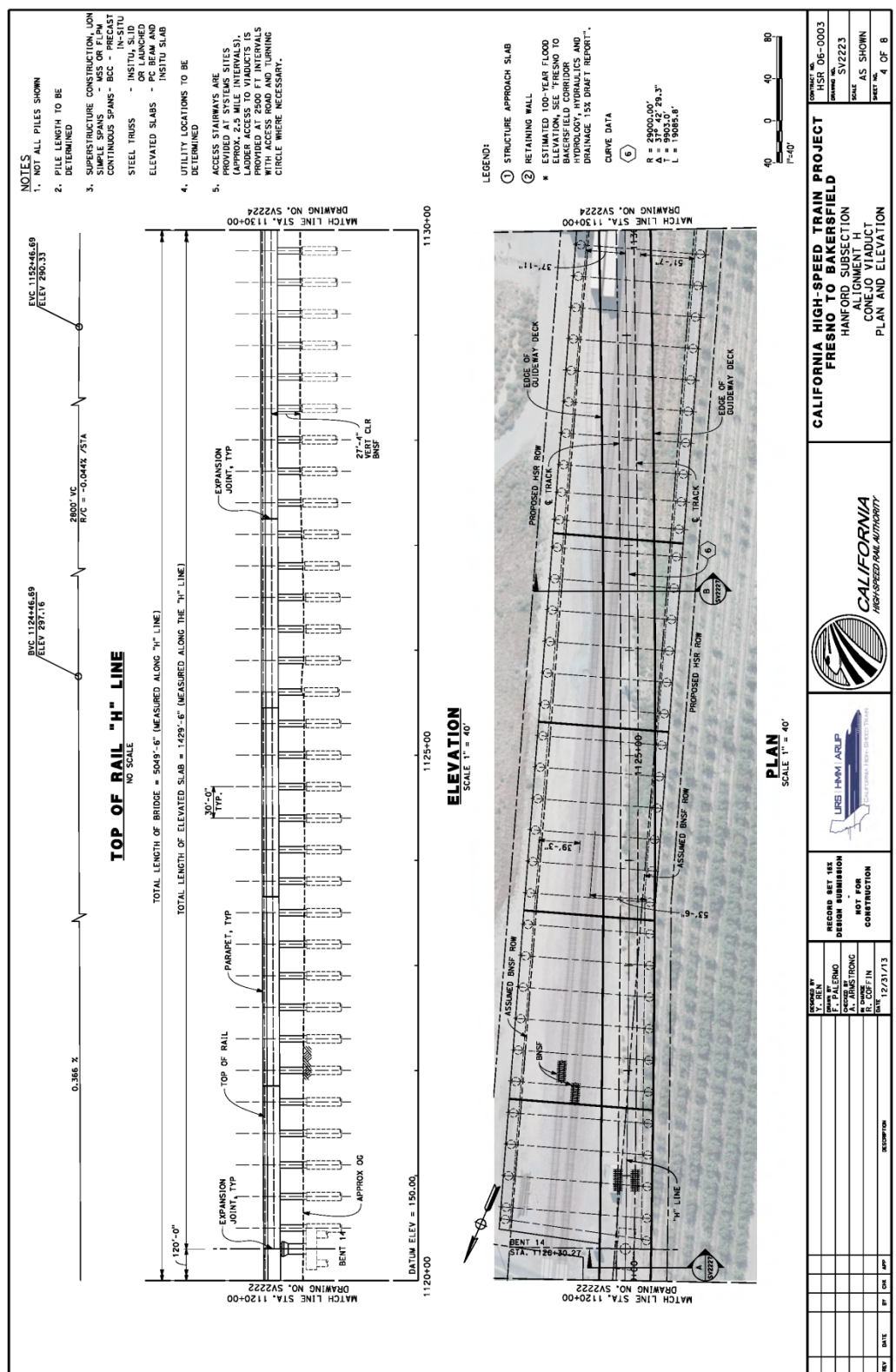
#### Part 4 – Mitigation measures

<b>OPERATIONS</b>	None.
<b>MAINTENANCE</b>	None
<b>INFRASTRUCTURE</b>	None
<b>RAILROAD SYSTEMS</b>	None.

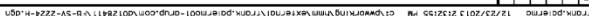
### Part 5 – List of Supporting Documentation to Design Variance Request

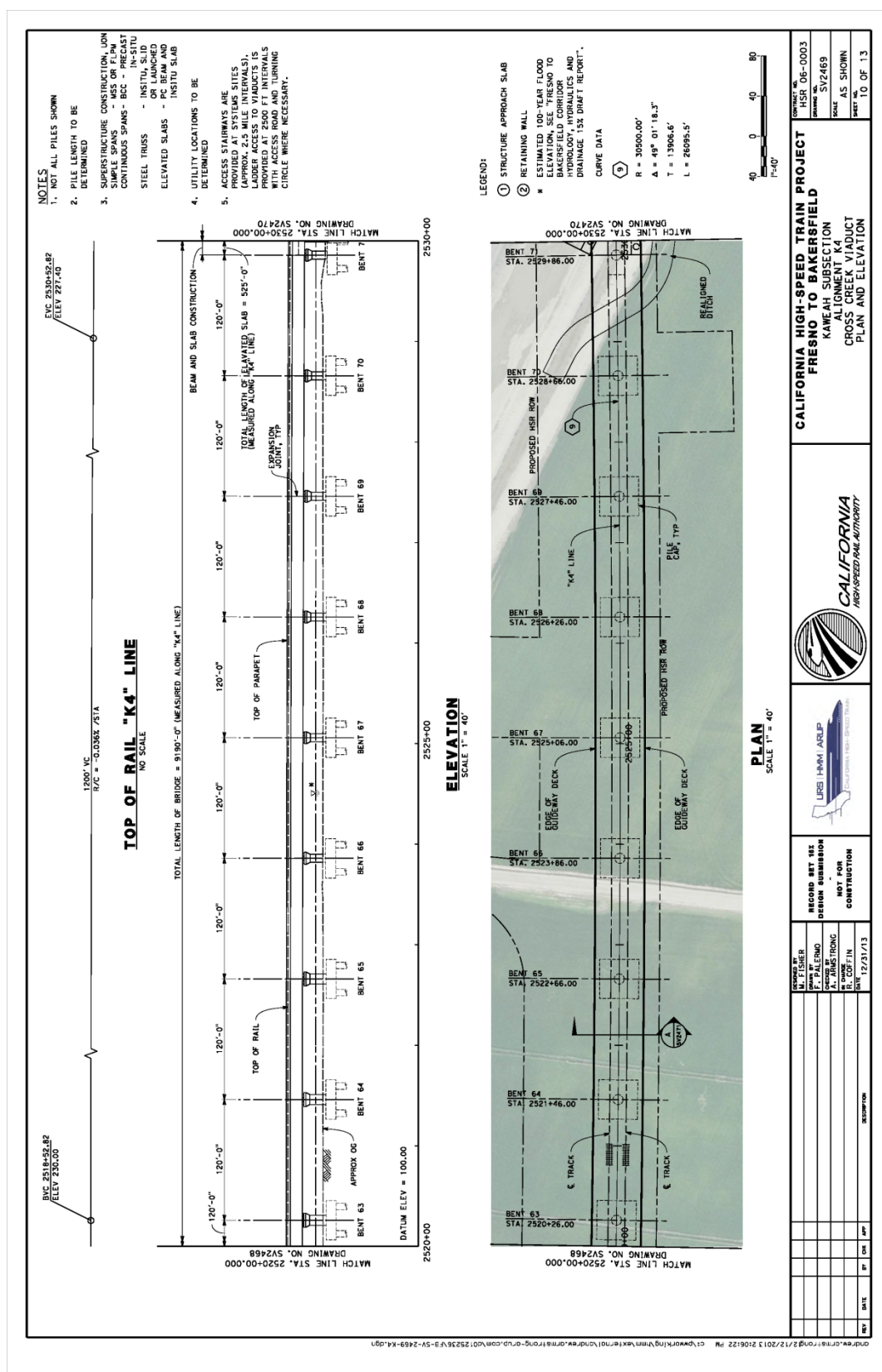
<b>ANALYSIS</b>	Structures Report for Package 2-3.
<b>PUBLICATION/STANDARD EXTRACTS</b>	TM 1.1.21
<b>RISK ASSESSMENT</b>	N/A
<b>DRAWINGS</b>	SV2223, SV2224, SV2469, SV2470, SV2493, SV2494, SV2495
<b>CALCULATIONS</b>	N/A
<b>EXPERT TESTIMONIALS</b>	N/A
<b>CORRESPONDENCE</b>	N/A
<b>OTHER</b>	N/A

Appendix A – 15% Record Set Drawing





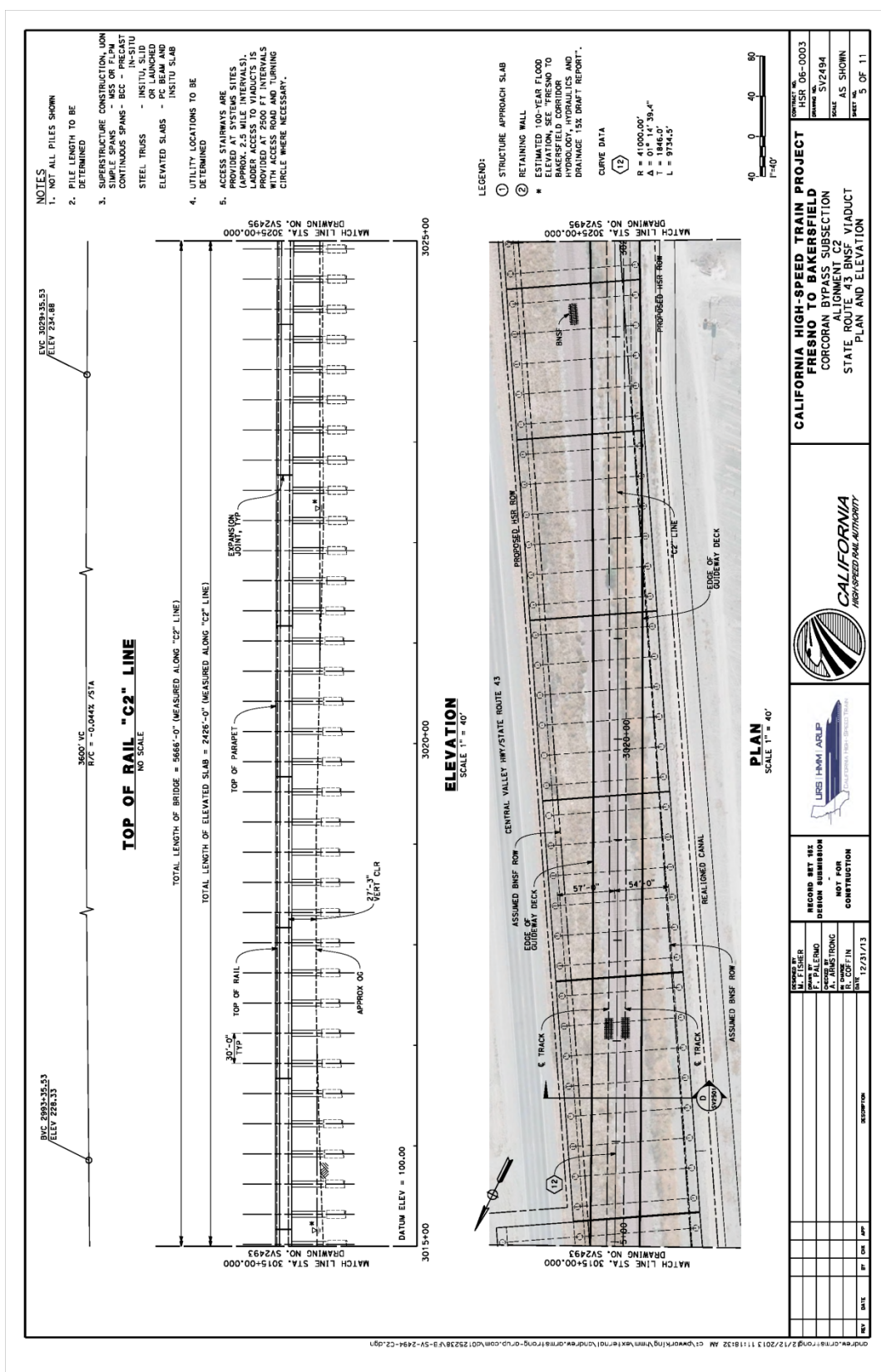


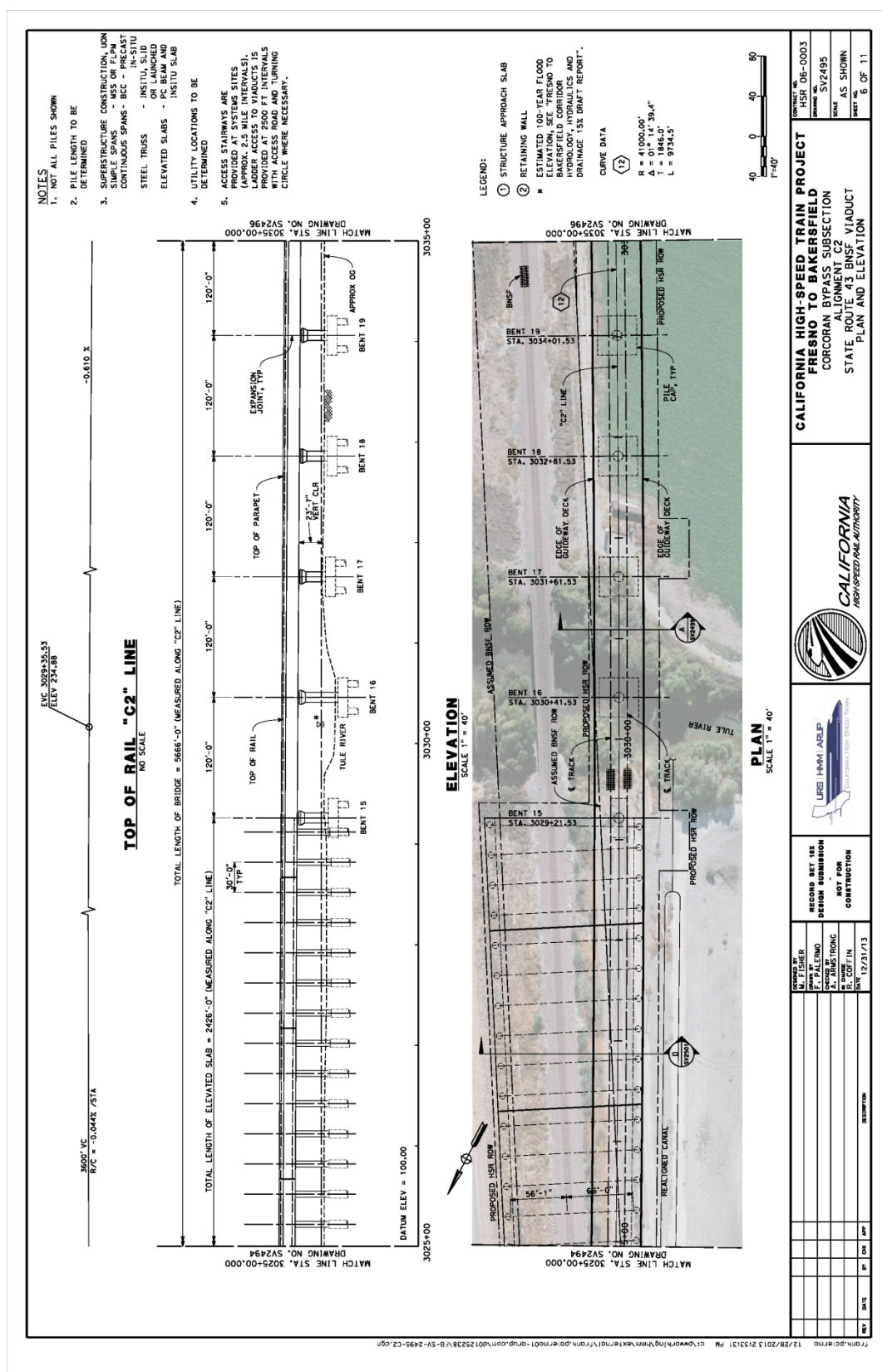












## Appendix B – TM and Directive Drawing Extracts



Extract from TM 1.1.21

### **3.3.1 Structures**

#### Aerial Structures

- 15-foot (Desirable), 10-foot (Minimum) wide maintenance access measured from outside edge of structure, typically the superstructure drip line but could be column or foundation for irregular structures (i.e., straddle bents) along the length of the aerial structure.
- 15-foot (Desirable), 10-foot (Minimum) wide clearance around the columns and foundations should be maintained to provide access to the columns and the foundations.